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ABSTRACT

The manual was designed to help public officials, physicians, nurses, and others to plan and implement an Early and Periodic Screening, Diagnosis and Treatment (EPSDT) program under Medicaid. Procedures for carrying out components of an EPSDT program are recommended. Part 1 discusses organization and administration of screening, diagnosis, and treatment, including topics such as component activities, goals and obstacles, and settings for screening. Part 2 discusses screening procedures such as scheduling and costs; the interview and physical examination; screening for immunization status, dental disease and care, eye problems, and hearing; developmental screening; and screening for tuberculin sensitivity, bacteriuria, anemia, sickle cell diseases and trait, and increased lead absorption. Appendixes are questionnaire forms and lists of contributors, consultants, and steering committee members. The document focuses on screening activities and their relationships to other parts of the EPSDT program; other documents in the series will consider delivery of diagnosis, treatment and followup services, dental care, developmental assessment and treatment, and training of screening personnel. (MYS)

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A GUIDE TO SCREENING

for the

Early and Periodic Screening, Diagnosis
and Treatment Program (EPSDT)

under

MEDICAID

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EC 070 479

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FOREWORD

This guide to SCREENING is the first in a series to be issued on various components of the Early and Periodic Screening, Diagnosis and Treatment Program under Medicaid (EPSDT). Others are concerned with Diagnosis and Treatment, being prepared by the American Academy of Pediatrics; Dental Care, by the American Society of Dentistry for Children and the American Academy of Pedodontics; Developmental Assessment and Treatment, by the American Orthopsychiatric Association; Training for Allied Health Personnel, by the Health Facilities Foundation; and Provider Participation, by the American Medical Association's Committee on Health Care of the Poor. I am confident these materials will be helpful to those involved in implementing this program -- state and local agencies and providers alike.

I am grateful to the American Academy of Pediatrics for initiating this difficult task, and wish to acknowledge my special appreciation to the project officers, Walter D. Campbell, M.D., Director of the Department of Community Services, American Academy of Pediatrics, and Helen E. Martz, Ph.D., Medical Services Administration, Social and Rehabilitation Service; the authors, William K. Frankenburg, M.D. and A. Frederick North, Jr., M.D.; members of the American Academy of Pediatrics' Steering Committee, and the numerous consultants (their names are listed in the Appendix) who gave so generously of their

support and professional expertise on behalf of this program.

EPSDT is a unique opportunity for providing comprehensive health care to millions of Medicaid-eligible children. The partnership expressed in this collaborative effort between physicians and dentists and government is a significant step toward the continuing collaboration so essential to carrying forward this program.

Howard Newman

Howard N. Newman
Commissioner
Medical Services Administration

June 1974

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PREFACE

This manual has been written to help public officials, physicians, nurses and others to plan and carry out an Early and Periodic Screening, Diagnosis and Treatment (EPSDT) program under Medicaid that will effectively meet some of the health care needs of eligible children. It focuses on screening activities and their relationships to the other components of the EPSDT program. Subsequent publications will deal more fully with other aspects of EPSDT: delivery of diagnosis, treatment and follow-up services; dental care; developmental assessment and treatment; and training of screening personnel.

Everyone concerned with EPSDT must recognize that screening is not an end in itself, but rather the first step in a detection process which includes both screening and diagnosis. Similarly, the detection process, without treatment, does not improve health and cannot be considered an end in itself. The entire series of processes -- screening, diagnosis and treatment -- must take place if the EPSDT program is to contribute to children's health.

Current medical knowledge is insufficient to provide a firm scientific basis for many of the recommendations made in this manual. For this reason, the co-authors relied on the recommendations of a small group of experts on the best current methods for performing, interpreting and following up each of the screening techniques described. The manuscript was reviewed by a group of state and local EPSDT officials, and their suggestions have been incorporated into the manual. An advisory committee appointed by the American Academy of Pediatrics provided guidance to the co-authors, reviewed the final version and approved it.

Thus, while the information and advice presented in this manual reflect the state of knowledge and of expert opinion as of late 1973, it cannot be considered infallible, complete or final. New knowledge will undoubtedly call for changes in its recommendations. Equally acceptable alternative techniques may be available currently for many of the recommended procedures. The recommendations describe one or a few good ways of carrying out the necessary components of an EPSDT program, not necessarily the only way.

None of the recommendations of this manual should be interpreted as limiting thoughtful innovations, experiments or variations based on local needs or opportunities.

Throughout the manual the term "parent" is used to indicate the person or persons responsible for the care of the child -- guardians, foster parents, grandparents or other relatives, as well as the older child himself.

A complete list of expert consultants is given in the Appendix on page 203.

A complete list of contributors is given on pages 201 and 202.

INTRODUCTION

The Place of Screening in Health Care

The purpose of a health screening program is to bring needed medical care to children who are not receiving it. Screening programs accomplish this goal by identifying children with health problems or needs that have not been recognized or have not been fully cared for, and by ensuring that these problems are adequately diagnosed and treated.

A child may fail to receive needed health care for several reasons:

- because the problem can be detected only by special tests or observations,
- because the medical importance of a problem or symptom is not recognized,
- because appropriate care has not been sought for a recognized problem,
- because needed preventive services have not been utilized,
- because the child has been neglected or abused.

If every child is to receive needed care, some person or persons must periodically survey each child to be sure there are no hidden problems, that the medical significance of any symptoms is known, that evidence of neglect and/or child abuse is identified and that necessary preventive and remedial measures are being taken. The Early and Periodic Screening, Diagnosis and Treatment program is designed to accomplish this task. Screening, diagnosis and

treatment programs are not an adequate substitute for the regular, continuing health supervision and care which every child requires. Together, they make up only a fraction of total health care, which also must include preventive services, treatment of acute illness and injury, patient counselling and health education.

The most effective strategy for discovering unmet health needs is to evaluate all children through the use of relatively simple and inexpensive tests and observations. These screening tests are designed to determine whether a child is at high risk -- quite likely to have a problem or unmet need; or at low risk -- quite unlikely to have a problem or unmet need. Next, more elaborate and costly diagnostic procedures can be used to determine which of the children in the high-risk group actually have problems or needs, and their exact nature and extent. By this strategy, low-risk children are spared the expense, discomfort and inconvenience of detailed medical evaluation, and scarce resources are concentrated on children with a high risk of having unmet needs.

For many children, such a screening strategy is incorporated into the regular pattern of health supervision or "well-child" visits with physicians or clinics. The Early and Periodic Screening, Diagnosis and Treatment program under Medicaid was designed to ensure that children from poor families receive the necessary screening services as part of their health care, both by making certain that such children receive regular care, and by specifying the set of screening procedures which should be included in the care of every child.

The Special Obligations of a Screening Program

When a patient seeks the advice of a physician or other health provider because of symptoms or distress, the provider is responsible for doing his or her best to solve the problem, given current knowledge and available resources. However, when a provider takes the initiative in discovering health problems in persons without complaints, as in screening, the provider should be certain that discovery of such problems will do more good than harm. Health screening subjects parents and children not only to inconvenience and discomfort, but also to anxiety about the meaning of positive or equivocal findings. Patients should be assured that knowing about the problem is better than not knowing about it. This means that:

- Medical knowledge should be adequate to deal effectively with the problems identified.

- Sufficient numbers of skilled providers and supportive staff are available or can be made available to care for any problems which are discovered, and they should have access to adequate laboratory, consultant, hospital and other specialized health facilities.

- Financial resources should be adequate to pay for all necessary diagnosis and treatment of problems discovered.

- Services should be available to help the patient and family find and use the necessary financial and medical care.

PART ONE: ORGANIZATION AND ADMINISTRATION OF SCREENING, DIAGNOSIS AND TREATMENT

CHAPTER 1. GOALS OF AN EFFECTIVE PROGRAM

A program which will bring needed health care to those who are not receiving it should accomplish the following goals:

1) It should reach all children eligible for the program and encourage and help the parents and children to participate.

2) It should evaluate each child with observations and tests which will effectively determine whether or not he or she may have any significant unmet need for medical care.

3) It should provide diagnostic services for each child at risk to determine whether a problem or need is actually present and the exact nature and extent of any such problem, including indications of neglect and/or child abuse.

4) It should provide preventive and treatment services for all children who need them, including appropriate referral and treatment for child abuse and neglect.

5) It should plan and arrange for the early identification and treatment of any needs which are likely to arise in the future and provide education that will promote the use of preventive health services.

CHAPTER 2. COMPONENT ACTIVITIES OF A SCREENING, DIAGNOSIS AND TREATMENT PROGRAM

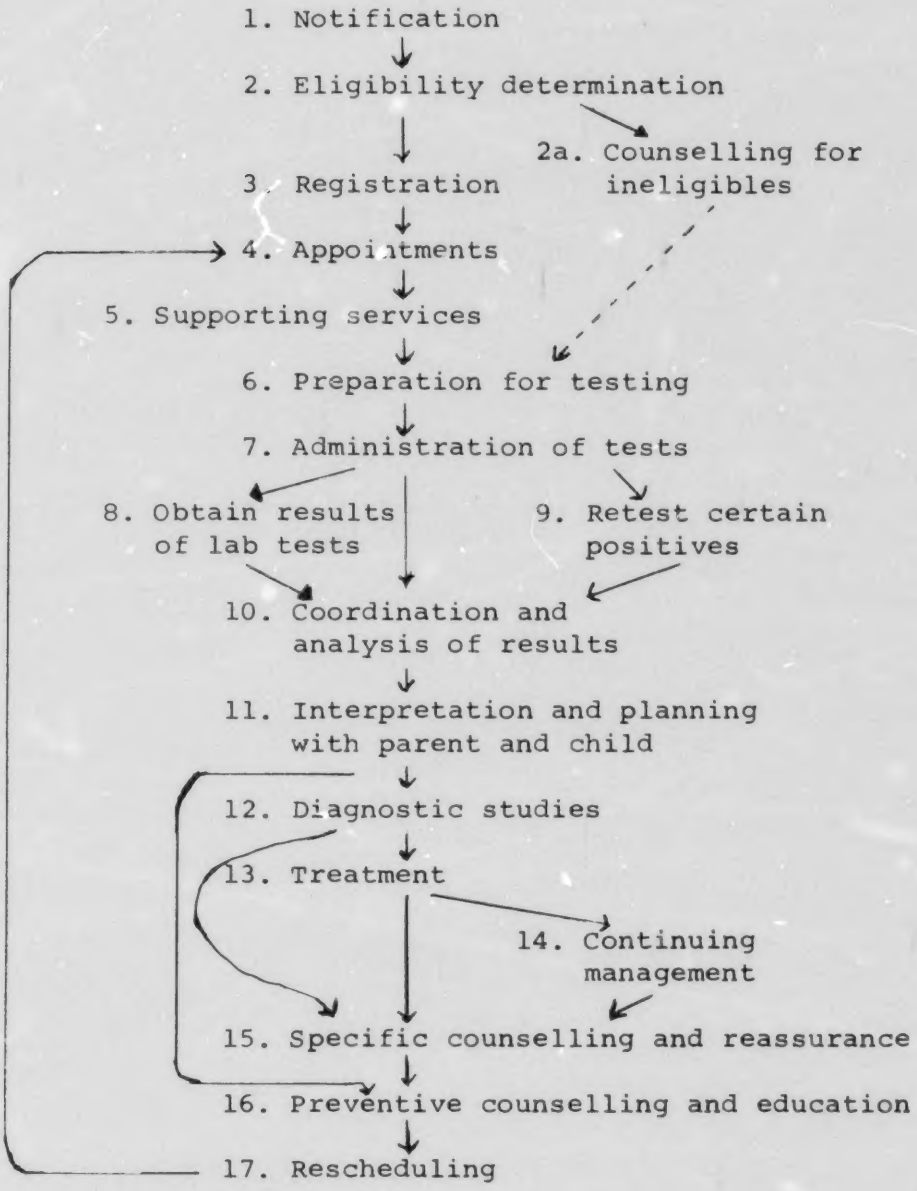
Certain activities are necessary in any program which will meet these goals. These are shown in Figure 1. All of these activities should be present, and they should fit together smoothly. Each of these component activities is further described and discussed in the paragraphs below.

1. Notification. Parents and children should be informed of the value of screening and encouraged to participate in health care which includes screening. There are several key opportunities to accomplish this:

- at the time of the mother's prenatal obstetrical care
- when the child is born
- at the time of visits to physicians, clinics or emergency rooms for acute or episodic care
- in preschool, child-development or day-care program
- in school
- during interview with social worker or welfare worker.

During the prenatal period and during her obstetrical hospitalization, the mother is eager to learn about and plan for the health of her child. Parents who will be eligible for Medicaid are usually identified

FIGURE 1. FLOW CHART OF SCREENING ACTIVITIES



at this time because of their medical expenses. Information about the child's gestation and delivery, important to later care, is easily available from hospital records.

Most children are seen by a doctor or clinic for some purpose several times each year. These visits should include efforts to bring all Medicaid-eligible children into continuing health supervision.

Large numbers of children and parents are brought together in schools and preschools, providing an opportunity to inform them about EPSDT.

Parents and children who are not informed by these methods may be reached through systematic reviews of the lists of eligible children maintained by public welfare agencies. Those who are eligible but not receiving screening, diagnostic and treatment services should, if possible, be personally interviewed. Telephone notification is less effective than personal interviews; personal letters are less effective than telephone interviews; and mailed brochures, form letters and announcements in public media are least effective of all. No more than ten percent response can be expected from mailed form letters or brochures.

2. Eligibility Determination. Mothers and children must meet certain criteria to be eligible for Medicaid services. If recruitment for EPSDT is done solely from existing public assistance rolls, eligibility is assured, but many families who are eligible for EPSDT who are not actually receiving public assistance will be overlooked.

Eligibility criteria, instructions and forms should be available to personnel at all of the sites where EPSDT notification and enrollment might be undertaken.

The simpler and more convenient the procedures for eligibility determination, the more likely it is that children who are potentially eligible will actually be included.

Children who are found to be not eligible for Medicaid-sponsored services should be helped to find appropriate health care services.

3. Registration. Eligible children should be added to the program lists and given some form of identification so that providers can identify them and carry out proper billing and reporting. Simple identification cards may be adequate. One useful form of identification is a coupon book (like the one that comes with a new car) that can be presented at the time of screening. The individual coupons may include instructions for the parent and can be submitted by the provider for billing and reporting.

4. Appointments for Screening Services. Each eligible child should be given a definite appointment with a physician or facility that provides screening services. Care should be taken that the appointments are convenient for the parent. Appointments which are made without regard to the other commitments of a parent are frequently broken, often resulting in a child's not getting necessary services and in wasted time for the screening provider. Whenever possible, parents should be given a choice of providers, and providers should be chosen who will give complete health care, not just screening tests.

5. Arrangements for Health-Related Supportive Services. Parents who cannot provide them should be

helped to obtain such services as transportation, bus and taxi fare, baby sitting, and translators, to enable them to keep their appointments and participate fully in the EPSDT program.

6. Preparation of Parents and Children for Testing. Parents should be informed of what they can expect of the screening evaluation, what records to bring with them, whether urine or stool specimens should be obtained and brought along, and what they should teach their child about the screening. Clearly worded printed instructions should be accompanied by personal instruction, or at least by an opportunity to telephone for clarification of any instructions which are not understood. Parents, for example, can teach their children "how to play the E game" if this method is used for screening visual acuity. Careful preliminary instruction can save much wasted time at screening and prevent the need for costly revisits.

7. Administration of Tests. The choice of screening tests and evaluations is discussed in other chapters of this manual. Tests should be selected and scheduled so that as much information as possible is available before the parent and child leave the screening site.

8. Special Laboratory Test Results. Results of certain tests, such as those which must be sent to a special laboratory (e.g., blood lead) or those which require substantial time (e.g., bacteriuria or tuberculin testing) will not be available at the time the parent and child leave the screening visit. These test results must be obtained from the laboratory and entered in the child's record. As with other results, they should be reviewed and interpreted

in conjunction with all other available information. Parents and children should be informed of their meaning, and any necessary diagnosis or treatment should be planned.

9. Retesting of Children with Certain Positive Tests. Certain of the screening tests give positive results in a large proportion of children who are actually normal. This may be because the abnormality is brief and self-limiting (as in reduced hearing acuity during a respiratory infection) or because the test used is less reliable than would be desirable (as in blood lead determinations). Children with positive findings on such tests should be retested, and the results of such retesting should be made available to those who will interpret screening findings and decide on a diagnostic and treatment plan.

10. Coordination, Analysis and Extension of Test Results. The findings from all screening procedures should be combined in a single record. This record should be reviewed by a physician or nurse practitioner who can ask the additional questions and perform the additional observations necessary to clarify the meaning and importance of positive findings, and who can plan or carry out further diagnostic studies.

The appropriate follow-up of most abnormal findings is determined not by the finding itself but by its relationship to other findings, both positive and negative. Therefore, referral should not take place (except in urgent circumstances) until all findings have been reviewed and a plan made which considers all findings. Otherwise, a child might be referred and treated by separate specialists for a variety of abnormal findings that are actually all manifestations of a single problem.

11. Interpretation and Planning with Parents and Children. All findings, both normal and abnormal, should be interpreted to the parent and child. When abnormal findings are present, their meaning should be carefully explained, and a plan made for any necessary further evaluation and for treatment. The plan should take into account any limitations of the family's ability to take time for medical care or to obtain health-related supportive services. Negative and normal findings should also be discussed, and parents and children should be reassured of the strengths and good practices which they do possess.

12. Diagnostic Studies. Diagnostic studies should be provided for each child who has had one or more possible problems discovered through screening. Such studies will determine whether or not the problem is actually present, its exact nature and extent, and the need for treatment.

13. Treatment. Each child with a diagnosed problem should receive treatment for the problem. This may include medication, surgery, counselling, physical therapy, speech therapy, special educational placement and a variety of other interventions which can remove or alleviate the problem.

14. Continuing Management and Re-evaluation. Many health problems are not "curable" in the traditional sense, but require continuing medical and other management over years or a lifetime. The EPSDT program should ensure that children with such problems and their families are brought under the care of physicians and others who can provide this continuing management and counselling. An important function of repeat periodic screening visits is to be sure that the child and family have continued to

obtain needed services for chronic health problems.

15. Specific Counselling and Reassurance. Any family whose child has required diagnostic or treatment services should receive specific reassurance about the problem in question. When diagnostic studies have revealed no problem, the parents should be carefully and specifically counselled that the child is normal. There is a great tendency for parents to assume that "there must be something wrong" when diagnostic evaluations have been made, and unless they are specifically counselled, such parents may impose unnecessary and unwise restrictions on the diets and activities of children who are fully normal. Similarly, families of children whose problem has been cured through treatment should be reassured and counselled, and families of children needing continued evaluation and care of problems not cured need reassurance and counselling about the many areas in which their child is normal and should not be restricted.

16. Preventive Counselling and Education. All families, whether or not their child has had any problems, should be given information about how to protect their child's health in the future, how and when to seek medical care, and how to maintain a healthy nutritional and psychological atmosphere in their home.

17. Scheduling Future Periodic Screening Evaluations. All children, whether or not problems have been discovered or treated, should be reassessed at intervals to ensure that no new problems have arisen. Scheduling for reassessment at an interval that is appropriate to the age and the special needs of the child should be part of each screening program.

CHAPTER 3. ADMINISTRATIVE PRIORITIES

The effectiveness of an EPSDT program will depend as much on how the component activities are organized into a total program as on how well each separate activity is performed. Similarly, the total cost of the program will be determined largely by the way in which the activities are organized and by how well they fit into the other child-health-care activities of the community.

In choosing among the many possible ways in which the EPSDT program might be administered and organized, the following priorities should constantly be kept in mind:

1) The organizational plan should ensure that all health problems discovered through screening receive treatment. Unless treatment is ensured, all other activities, no matter how well they are carried out, become largely worthless.

2) The activities should be organized in a manner that encourages and supports initial and continuing participation by parents and children. Only a program that is attractive and convenient will be utilized by families and children in need of its services.

3) The arrangements must encourage and support the continued participation of physicians and other

health-care providers in the EPSDT program. Unless their reasonable needs and desires are met, neither screening nor diagnostic and treatment services will be available to the children who need them.

4) The activities should be organized in a manner that keeps total program costs, not just costs of the screening component, to a level that is compatible with an effective program. The use of untrained personnel, for example, might reduce the cost of hearing screening, but might simultaneously result in greatly increased costs for additional appointments for rescreening, for unnecessary diagnostic evaluations, and even for unnecessary treatment.

5) The administrative arrangements should never demand or allow breaches in the confidentiality of medical and personal information regarding children and families.

6) The organization of activities should support and contribute to, rather than compete with or interfere with, good patterns of comprehensive health care both for EPSDT-eligible children and for the other children in the community.

While it will frequently be necessary to make compromises and trade offs between these priorities, all must be consciously considered at each point in the planning.

CHAPTER 4. OBSTACLES TO MEETING THE GOALS AND PRIORITIES OF EPSDT

Nearly a century of experience with programs having goals similar to those of the EPSDT program -- school health, well-child clinics, special screening programs for particular health problems -- has demonstrated that special efforts are necessary to overcome the many difficulties, obstacles and barriers which commonly arise in such programs.

Overcoming these obstacles depends on recognition that effective screening, diagnosis and treatment depends entirely on the cooperation of parents and the cooperation of health professionals. Any administrative arrangement which imposes on parents or providers delays, inconvenience or efforts which are unnecessary, or which appear to them to be unnecessary, will reduce their willingness to participate, and hence make the entire program less effective. The arrangements must be simple and convenient from the point of view of the parents and the providers, and not necessarily from the point of view of the planning or administering organization.

1. Simple and Efficient Administrative Procedures. Eligibility or registration activities which are complex, inconvenient or demeaning may keep many potentially eligible families from participating, and may cause others to drop out before the pro-

cedures are completed. They may also greatly increase the administrative costs of the program. Similarly, complex billing and reporting procedures may keep many physicians and organizations from participating and may cause others to participate much less extensively than they would under better circumstances. Administrative requirements which limit referral or treatment -- such as prior authorization for treatment or requiring that referrals be made to certain public clinics -- may reduce the willingness of parents and providers to participate in the program.

2. Avoiding Delays. Any delay in informing the parent of the need for treatment or in beginning such treatment will reduce the likelihood that treatment will be completed. Delays of weeks or months reduce the credibility of the entire program; parents may assume that if the recommendation was so long delayed, it cannot be very important. Similarly, delays in making appointments or providing supportive services will reduce the probability of continuing participation. Broken appointments which result from delays reduce the willingness of physicians to participate. Procedures which are likely to impose delay should be carefully evaluated to see if a quicker method, even if slightly less accurate or more costly, might be more satisfactory.

3. Eliminating Unnecessary Referrals. Each additional visit increases costs and reduces the probability of continued participation by parents. If screening is performed at a site that is not equipped to provide diagnosis and treatment, all abnormal findings will require referral visits. Selection of inaccurate screening tests or inaccurate performance of potentially accurate tests can result in large numbers of unnecessary referrals. Over-referral may make physicians receiving the referrals less willing

to participate. If each separate abnormality discovered on screening is referred to a different provider for care (e.g., TB to health department, hearing to audiologist, anemia to special clinic, etc.), parents may find themselves with a completely unmanageable set of appointments, and each treating facility may be unaware of what the others are doing.

4. Adequate Communication. Parents, children and physicians can operate effectively if they know what is expected of them and why it is expected. Parents and older children should know the purpose of the screening, and the meaning of both positive and negative results. Physicians who analyze and interpret results and who provide diagnosis and treatment need to have all appropriate information about the child and his family. Uninformed or misinformed parents and children are more likely to break appointments, come to appointments without important information or records, fail to comply with recommended treatment or even seek and obtain duplicative services. Parents may impose unnecessary or harmful limitations on the diet, play or other activities of their children. Physicians, if not given needed information, must expend expensive time and effort obtaining it. They may evaluate and treat one problem without adequate consideration of other evaluations or treatments that are simultaneously taking place, or they may completely ignore one important problem while concentrating on another. All of these results of poor communication will increase the cost and decrease the effectiveness of the program.

Key instructions, including appointments, should be given to the parent in writing. The parent should always know where to phone for further explanation or advice. All relevant information should be transmitted in writing to every physician involved

in the screening, diagnosis and treatment of an individual child, and the specific purpose of each referral should be clearly described in writing. In most instances, a complete record of the screening results, usually in photocopy form, should be sent to each involved physician.

5. Attractive Facilities, Pleasant and Interested Staff. Only very highly motivated people will continue to participate in a program which ignores their comfort and self-esteem. These factors, too often ignored in health facilities and programs for the poor, may often best be ensured by providing all EPSDT services in settings which simultaneously serve more affluent members of the community, who usually demand that they receive such consideration.

6. Avoiding Inconvenience. Long travel distances, inconvenient appointment hours and multiple visits to accomplish simple tasks will discourage continued participation, especially when it is evident that the same services could have been provided more conveniently. Similarly, forms, protocols or questionnaires which call for unnecessarily extensive information or which repeatedly seek the same information may be discouraging to parents, children and physicians. Planning efforts expended in reducing these irritations will be repaid amply by the more effective participation of families and physicians.

7. Respecting Established Patterns of Health Care. Unless special precautions are taken, children who are already receiving adequate health care may be rescreened and referred for care that might duplicate care that has already been obtained or planned. Parents may believe that such referrals are a

substitute for health supervision. Physicians may be upset if patients they have been caring for are referred elsewhere by a screening program. Every effort should be made to have screening performed where the child receives medical care and to coordinate all recommendations and referrals through the physician or clinic that has previously cared for the child.

8. Adequate Supportive Services. Many families will be able to participate in EPSDT only if such services as transportation, baby sitting for children who must be left at home, or translators are provided. Failure to arrange adequately for such services may result in broken appointments, reduced willingness of physicians to participate, increased program costs, and decreased program effectiveness.

9. Adequate Fee Schedules and Prompt Payments. Inadequate or delayed payment will make many physicians and clinics unable or unwilling to participate in an EPSDT program. Parents are much less willing to participate when they must regard themselves as second-class or charity patients.

10. Maintaining Medical Confidentiality. Neither parents nor physicians will willingly participate if they perceive that personal and medical information about the child and his family will be made available to non-medical personnel without the fully informed permission of the family. Social caseworkers, outreach workers, school teachers and others need certain information to carry out their tasks adequately, but their needs are limited and specific. Similarly, administrative officials of the EPSDT program need only limited information to carry out

their responsibility for accountability, quality control and monitoring, and most of the information which they need is aggregate information about groups of children. Summary reports which do not identify individual children or families are adequate for this purpose. Central filing systems and computer data banks require especially stringent safeguards, including limitations on the amount and type of data stored and limitations on who has access to the data.

11. Assuring Adequate Medical-Care Resources. There may be deficiencies in either the quality or the quantity of care available. Some dentists don't like to restore children's teeth; some physicians don't "believe in" the treatment of bacteriuria, while others too readily prescribe unneeded medications or unnecessary surgical procedures (e.g., tonsillectomies or umbilical hernia repair). An EPSDT program should depend upon a professional advisory committee to recommend tactful ways of identifying the best qualified providers and of applying guidelines or standards that will modify any undesirable activities.

In many instances the apparent unavailability of physicians is actually an unwillingness of physicians to participate in programs which are inadequate because of the obstacles described. Programs which overcome these obstacles may reveal that there is really no shortage of services. In many other instances the shortage of physicians and facilities may be localized. Excellent care for specialized and complex problems is always accessible if the family is willing and able to travel to a medical center and funds are supplied to pay for such travel and care. EPSDT programs should assure that such funds are available. However, in many localities there are real shortages of physician and other specialized manpower, especially for the common

problems: dental care, management of allergies, diagnostic eye evaluations. In these instances the only short-term solutions are either to transport the patients to places where such care is available or periodically to provide special clinics in which children are served by physicians or dentists "imported" from other areas.

Longer-term solutions to inadequate resources depend upon the appropriate use of non-physician personnel such as physician assistants, pediatric nurse associates and other allied health workers in addition to effective community efforts to recruit physicians and other scarce personnel. Both of these approaches require community-wide efforts. For example, many have urged that if screening services are to be carried out by non-physician personnel in special centers set up for the EPSDT program, planning must be done in conjunction with the physicians, dentists and other health professionals of the community. Without such planning professionals are unlikely to accept as valid the results of such screening.

While most of the specific procedures of screening can be performed exceedingly well by persons other than physicians, the use of such personnel must be carefully integrated into a system which is acceptable to physicians. Such personnel must work under the direct or indirect supervision of physicians and must rely on physicians to interpret the meaning of screening findings and to formulate the plans for diagnosis and treatment.

CHAPTER 5. SETTINGS FOR SCREENING: A RECOMMENDED PATTERN OF CARE AND SOME ALTERNATIVES

1. Comprehensive Health-Care Settings.* Ideally, each child should receive all of the screening services he requires as an integral part of continuing preventive health maintenance and illness care. The ideal setting is in a physician's office or clinic which provides comprehensive health care for children regardless of their economic situation or their source of payment. Children should come under such care at the time of birth (or prenatally). A single medical record should contain all necessary information. All necessary screening information should be obtained by workers closely associated with the physician or clinic and under his supervision. The screening information should be reviewed

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* A comprehensive health-care setting is a physician's office, clinic or program which provides preventive services, treatment of acute illness, and management of a wide range of continuing health problems in a single setting. It makes specific referrals for problems that it cannot completely manage alone. Examples of comprehensive health-care settings include individual physician's offices, group practices, neighborhood health centers, Children and Youth projects and health maintenance organizations (HMO's).

by the physician with the parent and child at the same visit. Any necessary diagnosis, treatment, counselling or reassurance should be initiated immediately. Necessary supporting services should be provided to the family at its request or the request of the physician.

Older infants and children who did not enter such care at the time of birth should be sought out and referred for continuing care whenever they obtain care from any physician, clinic or emergency room; when they enter school or a preschool program; or whenever their parents make contact with the welfare or public assistance systems.

Those laboratory tests which are best performed using expensive equipment or elaborate techniques should be sent to a central laboratory, and the results promptly reported to the physician, with abnormal results reported immediately by telephone.

Those aspects of diagnosis and treatment which cannot be performed by the primary physician should be coordinated by the physician and his or her staff.

Beginning at age three all children should receive comprehensive dental preventive and treatment services through a similar arrangement with a dentist or dental program.

This pattern of care avoids all of the previously described obstacles. It establishes a relationship between the family and the physician which neither party is likely to break, even if the family becomes ineligible for EPSDT services. It is compatible with pre-payment arrangements and with any future national health insurance program. It does not set up or perpetuate administrative or patient-care systems which are solely devoted to economically deprived children and thus are peculiarly vulnerable

to political budget-cutting.

When physician manpower resources are inadequate to provide this pattern of care for all eligible children, the alternative settings described below should be considered for some or all of the eligible children.

2. Schools, Preschools and Day-Care Programs. Many individual screening services can be performed effectively in schools, day-care centers or preschool programs. Children are already assembled, so that special transportation is unnecessary. Children are present every day and so follow-up on tests, such as the tuberculin test which requires two contacts with each child, or hearing tests which require retesting before referral, is relatively easy. Children can be instructed in screening techniques in classroom groups, reducing the effort necessary to instruct individual children. Screening tests can stimulate classroom learning about health, health care and about more general topics (e.g., height and weight measurements could lead to discussion of growth, of units of measurement, of averages, of graphing, etc.). Many schools already perform certain screening procedures for all enrolled children and have suitable equipment and trained personnel.

However, there are several potential problems. EPSDT-eligible children should not be identified as such within the school setting for screening purposes. School health programs do not usually transmit all screening information, both positive and negative, to physicians. Moreover, school health programs are not adapted to deal with infants and younger children. Parents are not readily available to provide information or to be counselled about results. All diagnosis and treatment, even for the most simple problems, must be obtained through referral. Referral mechanisms and follow-up procedures are often

not well-developed in existing school health programs.

EPSDT planners should acquaint themselves with whatever screening is already taking place in the schools. To the extent that an effective system can be developed for getting full information from such screening to those who provide EPSDT to school-age children, the tests done in school can be substituted for tests which might be done elsewhere. EPSDT programs can help all children in the community by promoting or establishing a better system for transmitting screening information obtained in the schools to all physicians caring for school children.

3. Existing Special Screening Programs within the Community. Special-purpose screening programs -- voluntary and public -- exist in many communities to identify such problems as visual defect, tuberculosis, lead poisoning or sickle-cell trait. Such programs may be able to contribute services, trained personnel, equipment or training to the EPSDT program.

There are several potential problems which may arise if an EPSDT program relies on such programs for services.

- A child may require visits to several separate sites in order to complete all tests necessary at a given age. The additional costs of transportation and of inconvenience for parents and children may be substantial.

- The problems of record-keeping and transmittal of information are multiplied when several separate sites or programs are involved in screening.

- Follow-up provided by existing programs is often incomplete.

- Such programs may make referrals directly to specialists, whose treatment may be inappropriate or incomplete if they do not have information obtained through the other tests and evaluations.

If all these problems are avoided, special programs may be useful for certain groups of tests or certain groups of children. For example, an existing lead-poisoning screening program might be willing to test blood samples not obtained at the lead-screening site, but in another setting such as a routine visit to a physician's office; to provide consultation, special laboratory services and referral care for children discovered to have increased lead absorption; and to obtain blood lead determinations at more frequent intervals from those children found to be at high risk.

4. Well-Baby or Well-Child Clinics in the Community. Many communities provide immunizations, screening tests, preventive counselling and sometimes limited diagnosis and treatment in publically supported well-child clinics. Such clinics are usually staffed by well-trained personnel with substantial experience in child-health care and whose time and talents may be underutilized. Well-child clinics are often equipped to perform screening procedures. While they have only limited capability for diagnosis and treatment, even this capability, along with their capability for immunization and preventive counselling, makes well-child clinics greatly preferable to sites established solely for screening.

The use of well-child clinics for screening presents the following disadvantages:

- They often meet on very limited schedules which may not meet the needs of working parents.

- Much diagnosis and treatment may have to depend on referral mechanisms.

- Families must obtain care for acute illnesses and injuries from other sources, resulting in duplication of records and follow-up. Also, this episodic and emergency care must be given without records of the preventive and screening care given by the well-child clinic.

- They frequently rely upon inadequate referral methods, often depending on parents to make appointments. Adequate transfer of information to physicians and others called upon to provide diagnosis and treatment has seldom been developed.

None of these disadvantages is disabling, and where well-child clinics represent the only alternative to separate screening sites, they should be utilized. To the extent that EPSDT planning can be used to tie the activities of well-baby clinics more closely to the system of care by physicians, all children in the community may benefit.

5. Special Sites Established for Screening. Mobile or fixed screening clinics may appear to offer such advantages as administrative simplicity, ease of quality control and economical use of special automated equipment. Such potential advantages may often be outweighed by the many potential disadvantages of screening at special sites.

The apparent administrative simplicity of special sites will be obviated by the multiple special arrangements which will be necessary to ensure continuing preventive services for all children and diagnosis and treatment for those with positive findings.

While formal control over the quality of screening tests may be easier at special sites, the quality of diagnosis, treatment and follow-up -- far more important to an effective EPSDT program -- will not be improved and may be harmed.

The apparent economical advantage of using automated equipment will rarely be achievable. Most of the screening tasks do not lend themselves to automation but require direct observation and interview. Those laboratory tests which can be performed more economically with automated equipment can often be forwarded to existing laboratories for processing.

The use of special screening sites invites nearly all of the previously described obstacles to an effective program. In addition, it establishes a system of health care for poor children that is separate from that used by other children, perpetuating a two-class system of medical care.

In a few situations, usually only when eligible children are widely dispersed in an area served by very few physicians, it may be economical to perform major parts of the screening at special screening clinics. All children would still require periodic visits with physicians and dentists, but the number and duration of such visits might be reduced, decreasing transportation costs and increasing the number of children who could be served by the available physicians. In any such special screening clinic every attempt should be made to provide immunizations, preventive counselling, and treatment of minor abnormalities on the spot.

6. Screening in the Home. The child's own home has several advantages as a site for some screening services, but these advantages are matched by substantial difficulties.

Developmental testing of young children may be most effective when performed in the home, where the child is more likely to be relaxed and to demonstrate his or her true potential, than in a crowded or noisy clinic after prolonged travel and waiting. Hearing and vision screening in the home has the same advantage, and the home may provide a more quiet setting for audiometry than can be found in many clinics. A home visit by a skilled observer might reveal problems of parent-child relationships that are not apparent in an office or clinic, and might also reveal special hazards for lead poisoning or for other accidental injury. When patients are widely dispersed geographically, it may be much more economical and convenient for a nurse or specially trained screening worker to visit homes than to transport parents and children to a central screening site, return them to their homes and provide baby sitting for children who must be left at home.

However, those who provide screening services in the home should be extremely well-trained and supervised. They should have a high respect for the confidentiality of personal and medical information, and the accuracy of their testing should be rechecked periodically, since they will not be subject to direct observation and supervision while they are doing their testing. Depending on local law and custom, and on whether or not highly trained nurses perform the visits, it may be difficult or impossible to include collection of blood specimens and provision of immunizations, preventive counselling, and immediate treatment and counselling for minor problems when screening is performed in homes.

CHAPTER 6. PLANNING AND COORDINATING

1. Statewide Planning. EPSDT is a state-administered program. Many of the decisions which determine the effectiveness of the program will be made on a statewide basis -- payment schedules, billing and reporting mechanisms, eligibility standards, etc. Coordination of EPSDT into the general Medicaid program will often require modification of the Medicaid regulations.

Federal regulations require that dental care and provision of eyeglasses and hearing aids must be incorporated into state Medicaid plans if not previously included. State Medicaid agencies should also examine their policies as they affect each of the obstacles to care discussed in Chapter 4. In addition, Medicaid policies should ensure that any child who has had a health problem discovered in the EPSDT program is able to receive necessary treatment, either by extending the period of eligibility or through other arrangements.*

Each state should have a professional advisory committee which can provide expert advice to the

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* Some children in families who cease to be eligible for cash payments may continue to receive medical and dental services for up to four months thereafter. (See Rules & Regulations, Federal Register 6-21-73, Vol. 30, No. 119, page 16311.)

responsible officials on both the medical desirability of its various policies and the likely reaction of physicians and other providers to the administrative and organizational aspects of the program. Such a committee should include a broad representation of pediatricians, family practitioners and other physicians, of dentists and other specialized health care providers, of the various statewide organizations of such providers, and of the state agencies concerned with implementation of the EPSDT program. It should include members with special competence in the organization and evaluation of health care. An advisory committee of parents is similarly necessary. Since the two advisory committees will usually be addressing different issues, they should usually not meet together. However, a few members of each committee should regularly attend the meetings of the other, both to keep their own group informed and to provide advice to the members of the other group.

2. Local or Regional Planning and Coordination. In most instances, counties or groups of counties will constitute the most logical local planning and coordinating jurisdictions for EPSDT programs.

Planning, coordination and administration at this local level may be provided by an existing health or welfare department, by a health planning agency, or by a separate public or private corporation under contract to the state.

The local or regional administering agency will usually be responsible for the following functions, though some may be performed on a statewide basis:

1) identifying all eligible children and

ensuring that they are enrolled in the Medicaid program

2) enlisting health care providers capable of providing screening, diagnostic and treatment services

3) assuring payment to providers for services

4) establishing and monitoring quality control mechanisms including:

   - formation of a consumer advisory panel
   - review of program statistics
   - periodic review of individual case records for completeness

5) providing or arranging for necessary health-related supportive services

6) providing or arranging for central laboratory processing for lead and sickle cell screening

7) establishing priorities for treatment when diagnostic and treatment services are limited, so that those most in need of such services get them first

8) adding or deleting items from the list of screening procedures in response to local needs and opportunities

9) arranging for additional service sources.

The local or regional agency, like the statewide agency, requires a professional advisory committee including physicians, dentists, providers of specialized health services, public health nurses and representatives of the health and welfare departments. Members of the consumer advisory com-

mittee should regularly meet with the professional advisory committee.

CHAPTER 7. SELECTION OF HEALTH PROBLEMS FOR WHICH TO SCREEN AND TESTS WITH WHICH TO SCREEN

Each of the health problems and screening methods described in the subsequent chapters of this manual has been selected because it meets certain criteria. Other problems and methods have been omitted because they fail to meet such criteria.

State and local planners will often be urged to include additional problems or tests in their screening programs. The criteria given below should be applied in deciding whether other problems or tests should be included.

Problem or Disease Selection

1) Is the problem or disease important to the affected individual? Little effort should be expended to detect problems which are self-correcting or "abnormalities" (such as minor degrees of flat feet) which have little effect on the functioning of the affected individual.

2) Is the problem or disease important to the community? Diseases which are contagious (such as tuberculosis), which affect a large number of persons (such as vision defects), or which require extensive resources for care (such as mental retardation) must be given higher priority than problems which affect only very few individuals. Clearly, if the effect on

the individual is great, screening can be justified even though relatively few individuals are affected. An example of a condition which is rare but which can be dramatically improved with early treatment is phenylketonuria.

3) Is the problem or disease treatable? There is no point in detecting problems if nothing can be done about them. Many conditions which are not "curable" are still treatable, in the sense that their impact on the affected individual and his family can be greatly modified through counselling, through rehabilitative services, such as special education, or through other forms of medical or non-medical management such as genetic counselling. Conditions for which there is general agreement about the type of treatment which is desirable and about the beneficial effects of such treatment are much more suitable for screening than conditions for which the type of treatment and its effectiveness are controversial or unproven.

4) Does early detection and treatment improve the effectiveness or reduce the cost of treatment? If a disease or problem will have the same consequences whether it is discovered early, through screening, or at a later time by producing symptoms, the cost and effort of screening cannot be justified. Early detection of such problems (childhood leukemia, for example) may only increase the period of worry and suffering and the medical care expenses of the affected person and his family.

5) Is there a substantial "lead time" between the time that the problem can first be discovered through screening and the time that it would ordinarily be detected without screening? If

this lead time is short, costs of a community screening program will be relatively high because screening will have to be repeated at frequent intervals. For example, juvenile diabetes has a lead time of no greater than one to three months (with current screening techniques). To detect the majority of cases before they could ordinarily be detected by symptoms would require that all children be screened at almost monthly intervals, which is clearly impractical.*

6) Are adequate resources available to diagnose and treat persons discovered through screening, or is there potential for their development? If facilities, personnel and funds are not immediately available to provide necessary diagnosis and treatment, screening may create anxiety and discontent in persons found to need such services. In many communities, for example, resources for evaluation and treatment of children with emotional problems and learning disorders are already overstrained. In the absence of diagnostic or treatment services, screening may be indicated only to demonstrate the need for such services and to provide the impetus for their further development. However, if the aim of screening is to demonstrate a need, the public should be so informed to avoid false expectations.

7) Are the total costs of screening, diagnosis and

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* In the case of juvenile diabetes screening is also contraindicated because treatment during the asymptomatic period is likely to be no more effective or economical than treatment after symptoms have appeared.

treatment for the problem justified by the benefits of early detection? Costs include not only the monetary costs of administering the screening tests and diagnosing all those found through screening, but also anxiety and inconvenience of children and families found to be at risk through screening but normal after diagnostic evaluation. The costs include, too, any ill effects which may occur if persons who actually have the problem in question are falsely reassured by inaccurate results. Benefits of early detection include reductions in human misery and disability, as well as any reductions in the monetary cost of treatment.

8) Is there a safe, economical, reliable, accurate and valid screening test for the problem in question? Even if the problem meets the other criteria, if available screening procedures are inaccurate, harm may be done through over-referral and under-referral and may exceed any benefits from early discovery.

For a disease or health problem to be included in a screening, diagnosis and treatment program, most of these questions must be answered affirmatively. To justify a special program focused on the specific problem, evidence that it meets each criteria should be strong.

CHAPTER 8. MONITORING THE EPSDT PROGRAM

The screening, diagnosis and treatment program must be periodically evaluated to be sure that it is actually having its desired effects. Such evaluation requires both statistical evidence and subjective judgments.

Part of the monitoring process will come from evaluating problems and complaints that arise during the program. The progress of the program should be discussed periodically with the participating physicians, dentists and other professionals, with administrative and screening staff, and with parents who participated in the program with their children. The children themselves may provide observations that can be useful in carrying out a more effective program.

In addition to responding to known problems, those responsible for administering the EPSDT program should periodically ask themselves a set of questions to be answered by actual statistics from the program records. The answers to such questions will indicate problem areas and will suggest improvements or changes which may be necessary to make the EPSDT program truly achieve its goals.

1. Questions about the Overall Program

   a) Of the total children eligible for the EPSDT program, how many have been identified and

notified of the availability of services?

b) Of the total number of registered children, how many have received each of the screening tests and procedures appropriate for their age?

c) Of the total children who have received the appropriate screening tests and procedures, how many have been found abnormal or suspect on each of the screening procedures?

d) Of all children found to be abnormal or suspect by screening procedures, how many have received recommended diagnostic and treatment services?

The last item should be the major factor in evaluating the effectiveness of an EPSDT program. Any child who has had a significant health problem identified through the screening process and who has not received or is not receiving adequate treatment for that problem represents a major failure in the program.

Summary Overall Program Evaluation Data

Screening Procedure	No.of Children to be Screened	No. Screened	No. Suspect	No. Completely Followed-up*

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* A child may be considered "completely followed up" if (s)he has
- been rescreened and found normal, or
- been fully evaluated and found to need no treatment, or
- received all necessary treatment, or
- established a continuing pattern of treatment and management

2. Questions about Specific Tests of the Program. In addition to questions about the overall success of the program, a further set of questions must be asked about each screening test or procedure which is included in the program.

a) Have all children for whom this particular test is appropriate (by reason of age or special susceptibility status) been tested?

If one or more tests are persistently omitted, it may be found that physicians, parents or others participating in the program do not recognize the importance or value of this test or that testing for this item is performed in a manner or setting not compatible with the rest of the testing program. For example, if tuberculin testing for school-age children is performed in the schools, children absent on the day of the testing may never be tested, or results of testing may not be adequately communicated to those responsible for evaluating the total screening results.

b) Is there an excessive number of over-referrals or under-referrals?

A large number of over-referrals tends to discourage the professional personnel who are performing diagnostic evaluations; it also greatly increases the cost of the program. Over-referrals may be due to:

- use of an inappropriate screening procedure
- improper administration of the screening test
- inadequate conditions under which the screening tests are performed (such as inadequate lighting for vision testing or excessive background noise for hearing testing)
- insufficient instruction of children, leading

to inadequate cooperation (as in hearing and vision testing)
- inappropriate screening criteria for normal and suspect
- lack of agreement between screening personnel and diagnostic and treatment personnel as to what constitutes a significant problem.

The number of over-referrals can be determined by comparing the number of suspect screening findings with the number of children determined to be abnormal on follow-up diagnostic studies. If the proportion of children with positive screening tests but negative diagnostic tests exceeds the proportion usually found with that testing method, the possibility of one of the problems described should be investigated.

The actual proportion of under-referrals can be determined only by providing diagnostic evaluations for a sample of children found negative on a screening test. Since few EPSDT programs are in a position to provide such follow-up, most will have to estimate the proportion of under-referrals by comparing the proportion of positive screening tests or confirmed diagnoses with the proportion usually found in testing children of similar age and socio-economic status.

c) Are there any special problems in completing diagnostic follow-up examinations and necessary treatment for children identified by any particular screening test?

Certain of the screening tests require specialized skills, equipment or facilities for adequate diagnosis and treatment. If follow-up for one particular screening test is particularly difficult to achieve, it may be that community facilities for this problem are inadequate or that suitable

coordination arrangements have not been worked out between the screening program and the specialized follow-up facilities.

PART TWO: SCREENING PROCEDURES

CHAPTER 9. SCHEDULING, PERIODICITY AND SEQUENCING PROCEDURES; COSTS

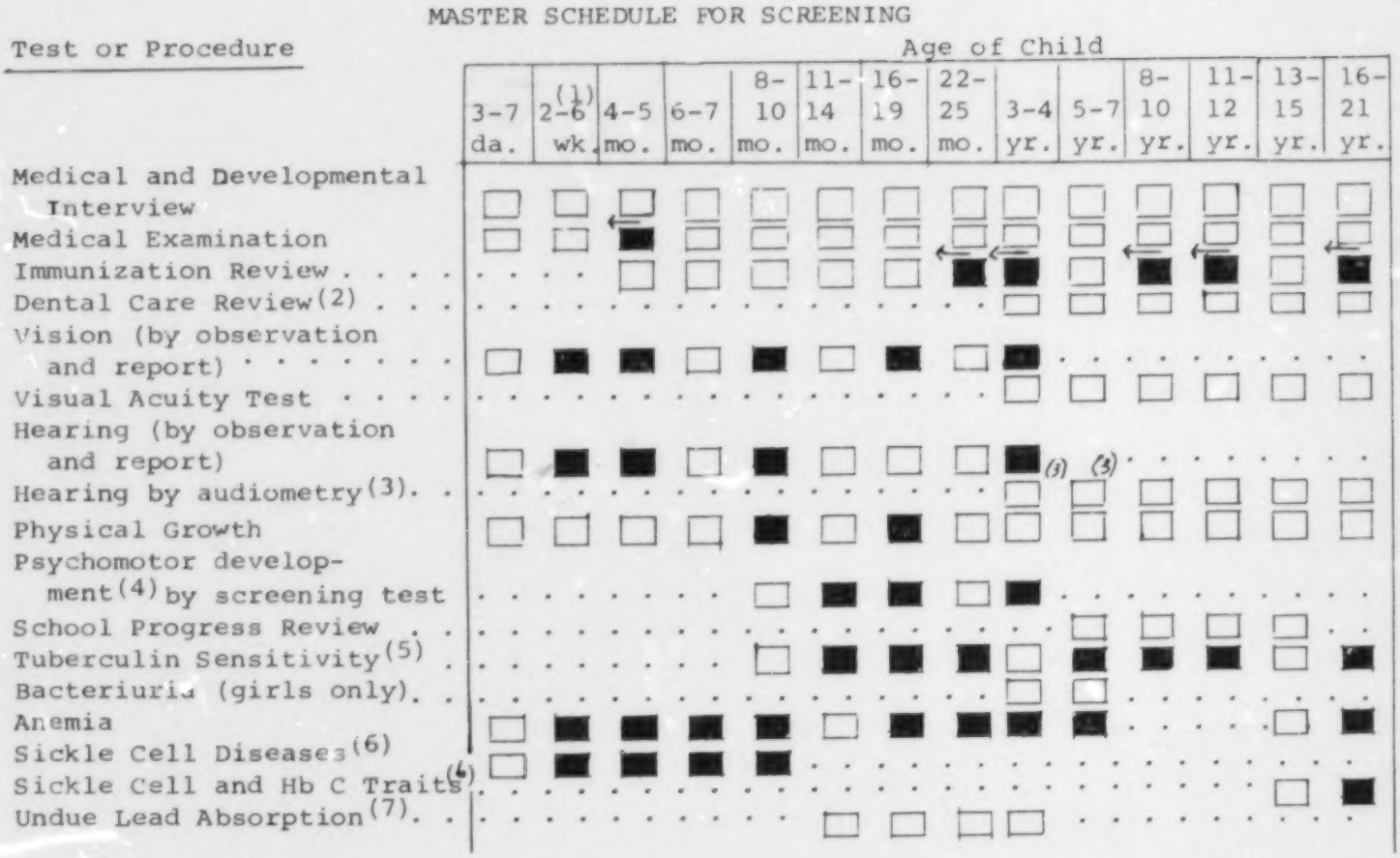
The chart on page 54 summarizes the ages at which each screening procedure should be carried out. Each of the remaining chapters in this section describes in detail the purpose, rationale, methods and interpretation of each of the procedures listed on this chart.

The precise age at which each visit is scheduled and each procedure is carried out is not critical. It is more important that the general pattern of screening indicated in the chart be incorporated into a pattern of preventive and therapeutic health care that is appropriate to the needs of each individual child. For most children in most communities this can best be assured by incorporating the screening procedures into the comprehensive health supervision which every child should receive.

Each of the following chapters includes a brief discussion of the cost of the procedure in terms of equipment, supplies and health-worker time. Costs calculated from these figures alone would greatly underestimate the cost of an EPSDT program. There are several other components of program cost which must be considered both in estimating total program costs and in determining fair fees for those who provide screening services. These include:

1. Administrative and Management Costs. Many of

MASTER SCHEDULE FOR SCREENING



KEY:

- ☐ Do at this age
- ■ Do at this age unless done at previously scheduled age

NOTES:

1. A visit at approximately 2 mos. of age is necessary to begin the normal immunization schedule.
2. Visual inspection of the mouth and teeth is part of the medical examination at all ages.

3. Test hearing yearly from age 3 to 6.
4. Test development earlier and more frequently in known high risk groups.
5. Test tuberculin less frequently or omit in known low risk groups.
6. See chapter 20 for special instructions.
7. Test only exposed children, test every 6 mos. from age 1 to 3 yrs.

these costs are not related to the size of the program, i.e., planning, writing of guidelines and informative literature, forms design, computer programming, evaluation design. These administrative cost contributions to the cost per child can be kept at a minimum by developing forms, procedures, information brochures, etc., on a statewide or regional basis and by adopting successful materials and procedures developed in one state or region for use in other states and regions. Other expenses -- notification, registration, record maintenance, arrangements with providers of screening, diagnostic and treatment services -- will vary with the number of children served and the number of participating health-care providers. The key to cost reduction is simplicity of forms and procedures.

2. Costs Related to Number of Visits. Each separate visit of the child and parent incurs costs for appointment-making, follow-up of missed appointments, transportation, reporting and bill payment. Each provider also incurs costs of scheduling, filing and retrieving records, reporting, billing, etc. Most physicians and clinics find that these costs alone -- not including any medical services -- approach $5 per visit. This group of costs is best controlled by combining as many screening, diagnosis and treatment functions as possible in the same visit.

3. Costs of Specific Tests and Procedures. In addition to the equipment, supplies and personnel time described in the chapters which follow, both medical and clerical personnel require initial training and continuing supervision.

For certain laboratory tests, the cost of obtaining,

labeling and recording the blood or urine sample will be incurred by the physician or clinic, while the cost of performing the laboratory determination will be incurred by the laboratory.

The sequence and "mix" of screening tests should be given careful consideration in planning. The following relationships should be kept in mind:

- Many screening procedures can be efficiently and effectively carried out in the hospital of birth before discharge. Blood tests for anemia and sickle cell diseases, answers to many items in the questionnaire, and the initial physical examination can be obtained at this time.

- If psychomotor development is carefully observed throughout infancy, other special screening for vision or hearing will not be necessary during infancy. Hearing problems will impair speech and language development, and visual problems will interfere with development of ability to manipulate small objects.

- Tests which require blood samples should be scheduled in conjunction with each other. A single finger or heel prick can obtain blood for both anemia and lead screening at age 12 - 15 months. A single blood sample might be used for anemia, syphillis and sickle trait screening in adolescence.

- The FEP test for undue lead absorption also tests for anemia and iron deficiency. Separate anemia testing should not be necessary in children screened for undue lead absorption with this method.

- Hearing, vision and developmental testing, all of which require good cooperation from the child, should be scheduled early in the visit, so that the child is not tired from waiting or made uncooperative by painful or unpleasant tests or examination. Appointments should be scheduled at times of the day when parents think their child will be at his or her best, especially when retesting because of positive or equivocal findings.

4. Costs of Diagnosis and Treatment. These costs will vary with the number and kind of health problems and with the number of false positives or over-referrals produced by the screening procedures. They will include not only the service costs, but also the direct and supporting costs necessary for each visit. For many children such costs can be greatly reduced by initiating diagnosis and treatment at the time of screening.

Thus, neither total program costs nor the fair price of an individual visit for screening can be estimated unless the functions to be performed at each visit are fully specified.

Further Reading

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CHAPTER 10. THE INTERVIEW AND EXAMINATION IN HEALTH SCREENING

1. Purpose and Rationale. The purpose of the interview and physical examination in health screening is to discover those diseases and health problems for which no standard screening test has been developed, including evidence of child abuse and/or neglect.

Most health problems can be detected most efficiently and effectively by questioning the child and parents and by physically examining the child. Some problems may not be detected or recognized by parents either because detection requires special examining skills and equipment or because the medical significance of easily observed symptoms or findings is not recognized. Answers to a standard set of questions and findings from a standard set of observations can identify those children who are at substantial risk of having a significant health problem and therefore need further diagnostic evaluation.

Both the prevalence of specific diseases and the findings which will identify the disease vary with the age of the child. Different questions and observations are therefore necessary at each age.

Since neither the age-specific prevalence of health problems nor the reliability and validity of various questions and observations in detecting problems has been studied extensively, the recommendations in this chapter are based more on expert opinion of

what "makes sense" than on scientific evidence. They have been selected to meet the following criteria:

- If the answers and observations recommended for a given age are all normal, the child is very unlikely to have a significant health problem (except for those problems which can be detected only by the standard screening tests described in this manual).

- If any observation or answer is abnormal, there is sufficient likelihood of a significant health problem to warrant further medical evaluation.

- If these questions and observations have not been answered and made, there is insufficient evidence to judge whether or not a significant problem is likely to be present.

The questionnaire and examination forms at the end of this chapter are intended to indicate the minimum information that will meet the above criteria for children of each age group. The precise wording can be changed, the format can be modified, and additional items may be added to respond to local problems and needs.

The schedule of examinations and interviews given in the Appendix is <u>not</u> adequate for any of the following purposes:

- <u>A program of preventive health supervision</u>. Counselling, health education and treatment of acute or minor problems will require additional visits, as will the special health care needs of children known to have problems or to be of special risk.

- Diagnosis of problems or disease. An abnormal answer or finding indicates that a problem may be present. Further examination and interview will be necessary to determine whether a problem is present and the exact nature of the problem.

- Immediate management of the newborn infant. While screening the newborn infant is of utmost importance, such examination and care is managed through programs of obstetrical and newborn care rather than through screening programs.

- Health care of older teenagers who marry or have children.

2. Identifying Children to be Screened. Since any child may develop new health problems at any age, all children must be repeatedly screened with interviews and examinations throughout childhood and adolescence.

3. Frequency and Timing of Screening. Beyond the immediate time of birth every child should have his or her health evaluated through interview and examination on at least the following minimal schedule of ages:

3-7 days (usually at the time of hospital discharge)
2-6 weeks
2-4 months
5-7 months
8-10 months
11-14 months
17-19 months
21-25 months
3-4 years
5-6 years (usually at the time of school entry)

8-9 years
11-12 years
13-15 years
17-19 years (usually at the time of leaving high school)

4. Methods and Personnel for Performing Interviews and Examinations.

a) The screening interview. This information may be obtained from parents and children through personal interview, through printed questionnaires or through automated "history-taking machines."

A personal interview allows the interviewer to clarify the meaning of both questions and answers, to pursue immediately further information about positive answers, to give appropriate reassurance and to establish rapport with the parent and child. It is the only feasible method for parents who do not read or write.

A printed questionnaire may save time for screening personnel and parents. If completed at home before the screening, parents will have an opportunity to check information through records or have discussions with others who know the child or family. Some parents and older children find it easier to write emotionally charged information on an impersonal questionnaire than to reveal it to an interviewer.

Automated methods have many of the characteristics of printed questionnaires, and in addition can usually perform some preliminary analysis of the responses, print out the results in an easily readable format and record data in a form suitable for computer storage and analysis. However, such methods are expensive to install and operate and will not therefore be used in most EPSDT programs.

Personnel who interview parents or help them to fill out questionnaires must be specially trained and supervised. It is especially important that they:

- maintain the confidentiality of medical and personal information which they obtain

- avoid making diagnostic interpretations or other comments about positive answers that may produce unnecessary anxiety in parents or children (unless they are qualified nurse practitioners or physicians)

- avoid giving inappropriate reassurance.

Several weeks of combined instruction and supervised practice will be necessary to ensure that interviewers have acquired the necessary skills. Nurses and experienced mothers will require shorter training and also are likely to have the knowledge and judgment necessary to explore and interpret positive answers of limited medical significance.

b) The physical examination. The examination may be performed by physicians, nurse practitioners or specially trained nurses or physician assistants.

A physician or nurse practitioner can immediately extend the screening examination to include additional observations and questions indicated by abnormal findings or interview responses. He or she can also provide on-the-spot reassurance about abnormal findings which have little medical significance.

Nurses and physician assistants without previous extensive training in performing and interpreting a physical examination will require substantial training and supervised experience to acquire the necessary skills, knowledge and judgment. They will not be

qualified to extend the examination if indicated by positive findings nor to make diagnostic interpretations of the findings. A very large proportion of children examined by such personnel will therefore require re-examination by physicians or nurse practitioners. Thus, the savings in cost and in scarce professional time which might theoretically be expected to result from the use of such personnel may not be realized.

c) Sequence of interview and examination in screening. One method of conserving professional time without a large investment in special training is 1) to distribute questionnaires to parents for completion before the screening visit, 2) to have a trained interviewer review the questionnaire for completeness and legibility and complete any parts which the parent had not understood, 3) to complete and record age-appropriate screening tests, 4) to have the physical examination performed by a physician or nurse practitioner who can confirm and extend all the information previously obtained, discuss the findings and interpretations with the parent and child and plan with them for any further evaluation or treatment.

5. The Meaning of a Negative Screening Interview and Examination. Infants, children and adolescents with normal interview and examination findings (and for whom other screening tests also give negative results) have a low probability of having significant remediable disease. The parents and children can be reassured that their progress to date is normal and encouraged to continue the child-rearing and health practices that they have been pursuing. The need for continued vigilance, prompt reporting of symptoms

and participation in preventive health supervision and subsequent screening evaluations should also be pointed out.

6. Follow-up of Positive Interview and Examination Findings. Since any single finding must be interpreted in connection with all other findings, and since further information must usually be obtained in order to interpret the significance of a positive finding, all positive findings must be followed up through interview and examination by a physician or nurse practitioner. Many positive findings will not indicate significant health problems. If there is a delay between the discovery of such findings and their interpretation, the parents and child may be caused considerable unnecessary worry.*

Many of the interview items will elicit a positive

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* Special note on child abuse and neglect: This recently recognized problem deserves special attention. Positive findings which should lead to further questions regarding abuse or neglect include: scars, bruises or other evidence of injury which are not explained; growth retardation; and lack of appropriate concern by the mother toward the child during the interview and examination. The interview question, "Do you have someone you call upon for help in case of family problems, accident or illness?" is especially relevant to identifying the mother who needs special support if her child is to be protected from the effects of child abuse, neglect or other problems of parent-child relationship. It has been clearly established that mothers of abused or neglected children are uniformly isolated from sources of such support. For further guidance in the follow-up of positive screening findings see: Helfer, R.E. and Kempe, H., Helping the Battered Child.

response from parents whose children do not currently have important medical problems (for example, past medical illnesses which have been completely treated and resolved and minor variations in normal sleeping, eating or behavior patterns which some parents may interpret as "problems"). A nurse or other screening worker such as an experienced parent with special training may be able to explore and interpret such answers with the parent and provide necessary information or reassurance before the child sees the physician, thus saving time for the physician and worry for the parents. However, a record of these parental worries and resolved past illnesses still should be part of the information available to the physician for his evaluation of the child's total health.

7. Time Required for the Interview and Examination. The total time consumed by the interview, examination and interpretation will usually average between 20 and 40 minutes per child. It will be shortest when 1) the general health status of the child is good, 2) the child has had continuing health supervision, 3) there are no language or other communication barriers between the child and parents and the screening personnel, 4) the evaluations are performed in the same setting in which the child receives his or her regular medical care and 5) records of past medical care and supervision are available. Approximately one-half to two-thirds of this time can be provided by workers other than physicians or nurse practitioners.

8. Other Examples and Sources of Interview and Physical Examination Forms and Schedules. (See Appendix No. 1, page 199.)

Further Reading

Bird, B. Talking with Patients. Philadelphia, Lippincott, 1955

Barness, L. A. Manual of Pediatric Physical Diagnosis, Chicago, Yearbook, 1973.

INSTRUCTIONS FOR USE OF FORMS

The forms which follow indicate the kind of screening information that should be gathered for children of various ages. They may be used as examples in constructing forms for local use or may be copied or duplicated directly.

The Interview or Questionnaire Form

1. Select the form appropriate for the child's age and mark the column corresponding most closely to the child's age.

2. Complete all questions indicated in this column, skipping questions marked with an arrow (←) if they have previously been answered and recorded. Parents may mark the forms directly or can be assisted by interviewers.

3. Record the YES or NO answer by circling the appropriate answer.

4. All abnormal answers fall into the left-hand column of answers. Each abnormal answer should be further discussed with the parent or older child, and appropriate details and explanations should be recorded either at the bottom of the form or in a separate note in the medical record.

5. The form may be used repeatedly for each evaluation during the age period covered by the form.

The Physical Examination Form

1. Select the form and the answer column appropriate to the child's age.

2. Record the observation as normal or abnormal by

circling or checking the letter "A" for abnormal or "N" for normal.

3. Complete all observations indicated in this column. Observations marked with an arrow ($\overleftarrow{a\ n}$) need not be repeated if they were previously made and recorded.

4. All abnormal findings should be further described and explained either at the bottom of the form or in a separate note in the medical record.

5. The same form may be used to record each of the evaluations which take place during the age period covered by the form.

A Note on Medical Records

These forms alone do not constitute an adequate record for the continuing health care of a child. When screening is done in a context of comprehensive health supervision, many questions can be asked and recorded only once (pregnancy and birth history, for example). Other questions can be asked and recorded once and rechecked and added to only when changes occur (data on family history, siblings, immunizations or past illnesses, for example).

A set of forms suitable for recording such accumulative health data has been published in Day Care Health Services: A Guide for Project Directors and Health Personnel, DHEW Publication No. (OCD) 72-4, available from the Office of Child Development, U. S. Department of Health, Education and Welfare, P. O. Box 1182, Washington, D.C. 20013, or from the U. S. Government Printing Office.

SCREENING INTERVIEW OR QUESTIONNAIRE
Age 3 days to 7 months

Instructions:
1) Questions should be answered by the mother or other person who regularly cares for the child.
2) Select the column appropriate for the child's age at the time of the evaluation and record answers in the column.
3) Answer each question by circling the correct answer (YES) NO or YES (NO).
4) When an arrow appears in the column, record the answer in the column to which the arrow points. If an answer is already recorded, the question need not be answered again.

* Screening staff may transcribe answers to items marked with an asterisk (*) from the obstetrical or newborn record.

	3-7 days	2-6 wks.	3-4 mos.	5-7 mos.
Does either parent or any person caring for this child have any serious or continuing health problem, any illness requiring medicines, or any handicap or disability?	*YES NO	←	←	←
Has the mother had any miscarriages, abortions, or babies who died after birth?	*YES NO	←	←	←
Have any brothers or sisters been born prematurely, had difficulties in the newborn period, had important illnesses or handicaps, or had trouble learning in school?	*YES NO	←	←	←

Does a parent or a brother or sister have any allergy (such as hay fever, asthma or ezcema)?	*YES NO	←	←	←
Are there any diseases or conditions which seem to run in the family?	*YES NO	←	←	←
Does this child live with or visit anyone who has tuberculosis or a chronic cough?	YES NO	←	←	YES NO
Did the mother have any trouble during her pregnancy with this child (such as bleeding, high blood pressure, rash, sugar in urine)?	*YES NO	←	←	←
Did the mother take any medicines other than vitamins or iron during this pregnancy?	*YES NO	←	←	←
Did the baby weigh less than 5½ lbs. or more than 9 lbs. at birth?	*YES NO	←	←	←
Was the baby born more than two weeks before or two weeks later than expected?	*YES NO	←	←	←
Did the baby have any trouble in the hospital or in the first days at home (such as trouble breathing, jaundice, bleeding, need for medicine, oxygen or other treatment)?	*YES NO	←	←	←
Has the baby had any illness or injury requiring medical care, been a patient in a hospital,or required surgery (not previously reported)?	YES NO	YES NO	YES NO	YES NO

Has the baby had a bad reaction to any immunizations or medicines (not previously reported)?	YES NO	YES NO	YES NO	YES NO
Has the baby had any kind of seizure, convulsion or black-out spell (not previously reported)?	YES NO	YES NO	YES NO	YES NO
Do you have any problems nursing or feeding the baby?	YES NO	YES NO	YES NO	YES NO
If bottle fed, does the baby take less than 16 oz. or more than 32 oz. in an average 24-hour period?	YES NO	YES NO	YES NO	YES NO
Do you use a commercially prepared canned or bottled infant formula?	NO YES	NO YES	NO YES	NO YES
Does the baby have any problems with sleeping with bowel movements, or with skin rashes such as diaper rash?	YES NO	YES NO	YES NO	YES NO
Is the baby generally happy and easy to care for?	NO YES	NO YES	NO YES	NO YES
Do you think the baby has any problem of health, growth, development or behavior (other than those already noted)?	YES NO	YES NO	YES NO	YES NO
Does the baby smile when you talk to him or her?	- -	NO YES	NO YES	NO YES

Does the baby babble, coo or squeal when he or she is happy?	- -	NO YES	NO YES	NO YES
Does the baby hold his or her head up for a minute or more when lying on stomach or back?	- -	- -	NO YES	NO YES
Does the baby roll over from back to stomach or stomach to back?	- -	- -	- -	NO YES
Do you ever leave the baby alone on a table, chair or bed?	YES NO	YES NO	←	←
If you ever take the baby in a car, do you use an approved safe car-seat that can be firmly held down by the seat belts?	NO YES	←	NO YES	←
Do you have someone you can call upon for help in case of family problems, accident or illness?	NO YES	NO YES	NO YES	NO YES

SCREENING INTERVIEW OR QUESTIONNAIRE
Age 8 months to 30 months

Instructions:
1) Questions should be answered by the mother or other person who regularly cares for the child.
2) Select the column appropriate for the child's age at the time of the evaluation and record answers in the column.
3) Answer each question by circling the correct answer (YES) NO or YES (NO).
4) When an arrow appears in the column, record the answer in the column to which the arrow points. If an answer is already recorded, the question need not be answered again.

* Screening staff may transcribe answers to items marked with an asterisk (*) from the previous screening record.

	8-10 mos.	12-14 mos.	17-19 mos.	23-25 mos.
Does either parent or any person caring for this child have any serious or continuing health problem, any illness requiring medicines, or any handicap or disability (not previously reported)?	*YES NO	←	←	YES NO
Have any brothers or sisters had important illnesses or handicaps, or had trouble with learning or behavior (not previously reported)?	*YES NO	YES NO	←	YES NO
Are there any diseases or conditions which seem to run in the family (not previously reported)?	*YES NO	←	←	YES NO

Does a parent or a brother or sister have any allergy (such as hay fever, asthma or eczema)?	*YES NO	←	←	←
Does this child live with or visit anyone who has tuberculosis or a chronic cough?	YES NO	←	←	YES NO
Does this child live in or visit a building which contains peeling or chipped paint or plaster, or does he or she play outdoors where there is peeling outdoor paint?	YES NO	YES NO	YES NO	YES NO
Did this child weigh less than 5½ lbs. or more than 9 lbs. at birth?	*YES NO	←	←	←
Was this child born more than two weeks before or two weeks later than expected?	*YES NO	←	←	←
Did this child have any trouble in the hospital or in his or her first days at home (such as trouble breathing, jaundice, bleeding, need for medicine, oxygen or other treatment)?	*YES NO	←	←	←
Has this child had any illness or injury requiring medical care, been a patient in a hospital or required surgery (not previously reported)?	YES NO	YES NO	YES NO	YES NO
Has this child had a bad reaction or allergy to any immunizations or medicines (not previously reported)?	YES NO	YES NO	YES NO	YES NO

Has this child had any kind of seizure, convulsion or black-out spell (not previously reported)?	YES NO	YES NO	YES NO	YES NO
Has this child ever had asthma or wheezing (not previously reported)?	YES NO	YES NO	YES NO	YES NO
Has this child ever had a urinary infection (not previously reported)?	YES NO	YES NO	YES NO	YES NO
Do you have any problem with feeding or nursing?	YES NO	YES NO	YES NO	YES NO
If bottle fed, does this child take less than 16 oz. or more than 32 oz. in an average 24-hour period?	YES NO	YES NO	YES NO	YES NO
Do you use a commercially prepared canned or bottled formula?	NO YES	NO YES	NO YES	NO YES
Does this child eat at least one serving from each of the following food groups in an average 24-hour period: Meat, fish, poultry, eggs Cereals, bread Fruits and vegetables?	NO YES	NO YES	NO YES	NO YES
Does this child have problems with sleeping, bowel movements or skin rashes?	YES NO	YES NO	YES NO	YES NO
Does this child urinate in a strong stream without dribbling or straining?	NO YES	←	←	NO YES

Does this child have frequent or persistent runny or stuffy nose?	YES NO	YES NO	YES NO	YES NO
Does this child use at least 3 words in a way that shows he or she knows what they mean?	- -	NO YES	NO YES	NO YES
Does this child reach for and play with small objects in a way that shows that he or she can see them?	NO YES	←	←	←
Does this child try to imitate sounds which he or she hears?	NO YES	←	←	←
Does this child appear to understand the meaning of many words which he or she hears?	- -	NO YES	←	←
Can this child walk without holding on?	- -	NO YES	←	←
Is this child generally easy and pleasant to be with?	NO YES	NO YES	NO YES	NO YES
Do you have someone you can call upon for help in case of family problems, accident or illness?	NO YES	NO YES	NO YES	NO YES
Do you keep all medicines and potentially poisonous household products in a locked cabinet out of this child's reach?	NO YES	NO YES	NO YES	NO YES
Do you ever leave this child alone in the bath?	YES NO	YES NO	YES NO	YES NO

SCREENING INTERVIEW OR QUESTIONNAIRE
Age 2½ years to 10 years

Instructions:
1) Questions should be answered by the mother or other person who regularly cares for the child.
2) Select the column appropriate for the child's age at the time of the evaluation and record answers in the column.
3) Answer each question by circling the correct answer (YES) NO or YES (NO).
4) When an arrow appears in the column, record the answer in the column to which the arrow points. If an answer is already recorded, the question need not be answered again.

* Screening staff may transcribe answers to items marked with an asterisk (*) from the previous screening record.

	3-4 years	5-7 years	8-10 years
Does the mother, father or any person caring for this child have any serious or continuing health problems, any illness requiring medicine, or any handicap or disability (not previously reported)?	YES NO	YES NO	YES NO
Does a brother or sister have any important illness or handicap or any trouble with learning or behavior (not previously reported)?	YES NO	YES NO	YES NO
Are there any illnesses or conditions which seem to run in the family (not previously reported)?	YES NO	YES NO	YES NO

Does a brother, sister or parent have any allergy such as hay fever, asthma or ezcema (not previously reported)?	YES	NO	YES	NO	YES	NO
Does this child live in or visit a building which contains peeling or chipped paint or plaster, or does he or she play outdoors where there is peeling outdoor paint?	YES	NO	YES	NO	-	-
Did this child have any trouble in the hospital at birth or in the first days at home (such as trouble breathing, jaundice, bleeding, feeding problems or need oxygen or medicines)?	*YES	NO	←		←	
Has this child ever been a patient in a hospital or required surgery (not previously reported)?	YES	NO	YES	NO	YES	NO
Has this child ever had a bad reaction or allergy to any immunization, to medicine or to insect bites (not previously reported)?	YES	NO	YES	NO	YES	NO
Has this child ever had a convulsion, seizure, fainting or black-out spell (not previously reported)?	YES	NO	YES	NO	YES	NO
Has this child ever had a urinary infection (not previously reported)?	YES	NO	YES	NO	YES	NO
Has this child ever had asthma or wheezing?	YES	NO	YES	NO	YES	NO
Does this child have frequent sneezing, stuffy or runny nose?	YES	NO	YES	NO	YES	NO

Does this child urinate with a strong stream without dribbling or straining?	NO	YES	←		←	
Does this child have frequent headaches, leg aches or stomach aches?	YES	NO	YES	NO	YES	NO
Other than colds, stomach upsets, sore throats and minor accidents, has this child had any illness or injury which required medical care (not previously reported)?	YES	NO	YES	NO	YES	NO
Do you think this child has any problem of health, growth, behavior or development other than those already noted?	YES	NO	YES	NO	YES	NO
Does this child eat at least 2 servings from each of the following food groups in an average 48-hour period: Meat, fish, poultry, eggs Fruits and vegetables Cereals, bread, etc. Milk, cheese, ice cream, etc.?	NO	YES	NO	YES	NO	YES
Did this child learn to walk, to talk and to play with small objects at about the same age as other children?	NO	YES	←		←	
Does this child speak clearly enough so that those who know him or her well can usually understand?	NO	YES	←		←	

Does this child speak clearly enough so that strangers can usually understand?	NO YES	←	←
Does this child enjoy the company of other children and play well with them?	NO YES	NO YES	NO YES
Is this child fully toilet trained night and day?	NO YES	NO YES	NO YES
Does this child have any problems with learning or discipline in school or preschool?	YES NO	YES NO	YES NO
Do parents or teachers think this child is particularly clumsy or uncoordinated?	YES NO	YES NO	YES NO
Does this child have any difficulty getting along with schoolmates and neighbors, brothers and sisters, or parents?	YES NO	YES NO	YES NO
Is this child generally easy and pleasant to be with?	NO YES	NO YES	NO YES
Do you have someone you can call upon for help in case of family problems, accident or illness?	NO YES	NO YES	NO YES
Has this child had careful instruction in traffic safety for pedestrians and bicyclers?	NO YES	NO YES	NO YES
Is this child left to care for himself or herself at home?	NO YES	NO YES	NO YES
Has this child learned to stay away from medicines and potentially poisonous household products?	NO YES	NO YES	←

SCREENING INTERVIEW OR QUESTIONNAIRE
Age 11 years to 21 years

Instructions:
1) Questions should be answered by the mother or other person who regularly cares for the child.
2) Select the column appropriate for the child's age at the time of the evaluation and record answers in the column.
3) Answer each question by circling the correct answer (YES) NO or YES (NO).
4) When an arrow appears in the column, record the answer in the column to which the arrow points. If an answer is already recorded, the question need not be answered again.

* Screening staff may transcribe answers to items marked with an asterisk (*) from the previous screening record.

	11-12 years	13-15 years	16-21 years
Have the parents, brothers or sisters had any important illness or handicap or any serious trouble with learning or behavior (not previously reported)?	YES NO	YES NO	YES NO
Are there any illnesses or conditions which seem to run in the family (not previously reported)?	*YES NO	YES NO	YES NO
Has this person ever been a patient in a hospital or required surgery (not previously reported)?	*YES NO	YES NO	YES NO

Has this person had a bad reaction or allergy to any immunizations, to medicines or to insect bites (not previously reported)?	YES	NO	YES	NO	YES	NO
Has this person ever had a urinary infection (not previously reported)?	YES	NO	YES	NO	YES	NO
Has this person ever had asthma or wheezing (not previously reported)?	YES	NO	YES	NO	YES	NO
Does this person have any problems with sleeping, skin rashes, bowel movements or bed wetting?	YES	NO	YES	NO	YES	NO
Does this person have frequent or persistent sneezing or runny or stuffy nose?	YES	NO	YES	NO	YES	NO
Does this person have frequent headaches, leg aches or stomach aches?	YES	NO	YES	NO	YES	NO
Do parents or teachers think this person is particularly clumsy or uncoordinated?	YES	NO	YES	NO	YES	NO
Has this person failed or been held back in school or are grades in any subject regularly unsatisfactory?	YES	NO	YES	NO	YES	NO
Does this person have any difficulty getting along with teachers, schoolmates, neighbors, parents, brothers or sisters?	YES	NO	YES	NO	YES	NO

+Has this person been arrested or had other difficulties with the police?	YES	NO	YES	NO	YES	NO
Do you think this person has any problem of health, growth, development or behavior other than those already noted?	YES	NO	YES	NO	YES	NO
Does this person have any special concerns about his or her health, development, growth or personality?	YES	NO	YES	NO	YES	NO
Does this person eat at least 2 servings from each of the following food groups in an average 48-hour period: Meat, fish, poultry, eggs Fruits and vegetables Cereals, bread, etc. Milk, cheese, ice cream?	NO	YES	NO	YES	NO	YES
Do you think that this person is generally pleasant and easy to live with?	NO	YES	NO	YES	NO	YES
+Does this person regularly use tobacco, alcohol or other drugs?	YES	NO	YES	NO	YES	NO
+Has this person had sexual intercourse?	-	-	YES	NO	YES	NO

+ Questions of a highly personal nature may be discussed directly with the examining physician without recording the answers in the record.

SCREENING PHYSICAL EXAMINATION

Age 3 days to 7 months

Instructions:

1) Select the column appropriate for the child's age.
2) Record examination results by circling or checking the letter (A) N for abnormal, A (N) for normal.
3) When the answer space contains an arrow and small letters (a ← n), the item may be omitted from the examination if it was recorded at the last age indicated by upper case letters.
4) Any abnormal findings should be completely described at the end of this form or on a separate note.

	3-7 days		1-4 mos.		5-7 mos.	
General appearance, body shape, size and proportions	A	N	a ← n		A	N
Facial features, head shape, ear shape, hands, feet	A	N	a ← n		A	N
Skin -- texture, rash, deformities, birthmarks	A	N	A	N	A	N
Palpation of sutures and fontanelles	A	N	A	N	A	N
Inspection of conjunctiva, cornea, iris, red reflex, pupillary reaction to light	A	N	A	N	A	N
Eyes follow light or object and move conjugately	A	N	A	N	A	N

Ophthalmoscopy of central retinas	A	N	a ← n		A	N
Otoscopic exam of ear canals and drums	A	N	a ← n		A	N
Inspection of palate, uvula, pharynx, dental ridge and oral membranes	A	N	A	N	A	N
Palpation for submucous palatal cleft	A	N	a ← n		a ← n	
Both nasal airways patent	A	N	a ← n		a ← n	
Palpation of clavicles	A	N	a ← n		a ← n	
Inspection and palpation of neck and axilla	A	N	A	N	A	N
Chest configuration and respiratory movements	A	N	A	N	A	N
Auscultation of lungs	A	N	A	N	A	N
Heart sounds - rate, rhythm, tone, murmurs	A	N	A	N	A	N
Femoral pulses palpable and equal	A	N	a ← n		A	N
Palpation of abdomen for musculature, organs, masses	A	N	A	N	A	N
Genitalia including size, shape, masses in labia or spermatic cords	A	N	A	N	A	N
Hips by abduction and Ortolani maneuver	A	N	a ← n		A	N

Muscle tone, strength and mobility of extremities, trunk and neck by manipulation and inspection	A	N	a ← n		A	N
Mother's attentiveness to child's comfort and safety during the examination	A	N	A	N	A	N

SCREENING PHYSICAL EXAMINATION
Age 7 months to 30 months

Instructions:
1) Select the column appropriate for the child's age.
2) Record examination results by circling or checking the letter (A) N for abnormal, A (N) for normal.
3) When the answer space contains an arrow and small letters (a n), the item may be omitted from the examination if it was recorded at the last age indicated by upper case letters.
4) Any abnormal findings should be completely described at the end of this form or on a separate note.
5) Items marked with an asterisk (*) need not be repeated if they were recorded on the 3-day to 7-month screening Physical Examination record.

	8-10 mos.		12-14 mos.		17-19 mos.		23-30 mos.	
Gait, posture and body proportions	A	N	A	N	A	N	A	N
Vocalizations and speech appropriate for age	A	N	A	N	A	N	A	N
Facial features, head shape, hands, feet	A	N	A	N	A	N	A	N
Skin -- texture, rash, deformities, birthmarks	A	N	A	N	A	N	A	N
Inspection of lids, conjuctiva, cornea, iris	A	N	A	N	A	N	A	N

Eyes follow light or object and move conjugately	*A	N	A	N	a ← n		A	N
Ophthalmoscopy of central retina, pupillary reactions to light	*A	N	A	N	a ← n		A	N
Otoscopic exam of ear canals and drums	*A	N	A	N	a ← n		A	N
Inspection of palate, uvula, pharynx, dental ridge and oral membranes	A	N	A	N	A	N	A	N
Dental caries	-	-	-	-	A	N	A	N
Palpation for submucous cleft palate	*A	N	a ← n		a ← n		a ← n	
Nasal mucous membranes	*A	N	A	N	a ← n		A	N
Inspection and palpation of neck and axilla	A	N	A	N	A	N	A	N
Chest configuration and respiratory movements	A	N	A	N	A	N	A	N
Auscultation of lungs	*A	N	A	N	a ← n		A	N
Auscultation of heart -- rate, rhythm, tone, murmurs	*A	N	A	N	a ← n		A	N
Femoral pulses -- palpable and equal	*A	N	A	N	a ← n		a ← n	

Palpation of abdomen -- musculature, organs, masses	*A	N	A	N	a ← n		A	N
Genitalia -- size, shape, masses in labia or spermatic cords	*A	N	A	N	a ← n		A	N
Hips -- abduction and Ortolani maneuver	*A	N	a ← n		a ← n		a ← n	
Muscle tone, strength and mobility of extremities, trunk and neck by manipulations and inspection	*A	N	A	N	a ← n		A	N
Mother's attentiveness to child's comfort and safety during examination	A	N	A	N	A	N	A	N

SCREENING PHYSICAL EXAMINATION

Age 2½ years to 10 years

Instructions:

1) Select the column appropriate for the child's age.
2) Record examination results by circling or checking the letters (A) N for abnormal, A (N) for normal.
3) When the answer space contains an arrow and small letters (a←n), the item may be omitted from the examination if it was recorded at the last age indicated by upper case letters.
4) Any abnormal findings should be completely described at the end of this form or on a separate note.
5) Items marked with an asterisk (*) need not be repeated if they were recorded on the 3-day to 7-month screening Physical Examination record.

	3-4 years		5-7 years		8-10 years	
Gait, posture and body proportions	A	N	A	N	A	N
Speech -- intelligibility, tone and quality	A	N	A	N	A	N
Facial features, head shape, hands, feet	A	N	A	N	A	N
Skin -- texture, rash, deformity, birthmark	A	N	A	N	A	N
Inspection of eyelids, conjunctiva, cornea, iris	A	N*	A	N	A	N
Conjugate eye movements, pupillary reactions to light, central retina by ophthalomoscope	A	N	A	N	A	N

Otoscopic exam of ear canals and drums	A	N	A	N	A	N
Nasal mucous membranes	A	N	A	N	A	N
Inspection of palate, uvula, pharynx, dental ridge and oral membranes	A	N	A	N	A	N
Dental caries	A	N	A	N	A	N
Inspection and palpation of neck and axilla	A	N	A	N	A	N
Chest configuration and respiratory movements	A	N	A	N	A	N
Auscultation of lungs	A	N	A	N	A	N
Auscultation of heart -- rate, rhythm, tone murmurs	A	N	A	N	A	N
Femoral pulses -- palpable and equal	*A	N	a←	n	a←	n
Palpation of abdomen -- musculature, organs, masses	A	N	A	N	A	N
Genitals -- size, shape, masses in labia or spermatic cords	A	N	A	N	A	N
Muscle tone, strength and mobility of extremities, trunk and neck by inspection of spontaneous activities	A	N	A	N	A	N
Spine -- no scoliosis when observed in flexion.	-	-	-	-	A	N

Fine coordination -- balance on each foot extend arms and hands without chcreiform or other abnormal movements, copy age appropriate geometric forms	-	-	A	N	a ←	n
Mother's and child's reaction toward each other during examination	A	N	A	N	A	N
Blood pressure (one arm) record_____	-	-	-	-	A	N

SCREENING PHYSICAL EXAMINATION

Age 11 years to 21 years

Instructions:

1) Select the column appropriate for the child's age.
2) Record examination results by circling or checking the letters (A) N for abnormal, A (N) for normal.
3) When the answer space contains an arrow and small letters (a← n), the item may be omitted from the examination if it was recorded at the last age indicated by upper case letters.
4) Any abnormal findings should be completely described at the end of this form or on a separate note.
5) Items marked with an asterisk (*) need not be repeated if they were recorded on the 3-day to 7-month Physical Examination record.

	11-12 years		13-15 years		16-21 years	
Gait, posture and body proportions	A	N	A	N	A	N
Secondary sexual development	A	N	A	N	A	N
Speech -- intelligibility, tone, quality	A	N	A	N	A	N
Facial features, head shape, hands, feet	A	N	A	N	A	N
Skin -- texture, rash, deformities	A	N	A	N	A	N
Inspection of lids, cornea, conjunctiva, iris	A	N	A	N	A	N

Conjugate eye movements, pupillary reactions to light, ophthalmoscopic exam	*A	N	A	N	a ←	n
Otoscopic exam of ear canals and drums	A	N	A	N	A	N
Nasal mucous membranes	A	N	A	N	A	N
Inspection of palate, uvula, pharynx, gums teeth and oral membranes	A	N	A	N	A	N
Dental caries	A	N	A	N	A	N
Inspection and palpation of neck and axilla	A	N	A	N	A	N
Inspection and palpation of breasts	A	N	A	N	A	N
Chest configuration and respiratory movements	A	N	A	N	A	N
Auscultation of lungs	A	N	A	N	A	N
Auscultation of heart -- rate, rhythm, tone, murmurs	A	N	A	N	A	N
Femoral pulses	*A	N	a ←	n	a ←	n
Palpation of abdomen -- musculature, organs, masses	A	N	A	N	A	N
Spine -- no scoliosis when observed in flexion	A	N	A	N	a ←	n

Genitalia -- size, shape, age appropriate development, hernias or other masses	A	N	A	N	A	N
Pelvic exam -- manual and speculum, including pap smear	-	-	-	-	A	N
Pelvic exam -- manual and speculum, including pap smear and gonorrhea culture (all girls who are sexually active according to interview)	A	N	A	N	A	N
Blood test for syphillis (boys and girls who are sexually active according to interview)	A	N	A	N	A	N
Muscle tone, strength and mobility of extremities, trunk and neck by inspection of spontaneous activities	A	N	A	N	A	N
Blood pressure, one arm	A	N	A	N	A	N
Parent and child behavior during interview and examination	A	N	A	N	A	N

CHAPTER 11. SCREENING FOR IMMUNIZATION STATUS

1. Purpose and Rationale. The purpose of screening for immunization status is to ensure that every child is protected from immunizable diseases at the earliest possible age and that he or she remains so protected. This protection can be achieved by identifying and immunizing every child who has not already received age-appropriate immunizations.

There are seven diseases for which immunization is currently recommended for all children: diphtheria, tetanus, pertussis (whooping cough), poliomyelitis, measles, rubella (German measles) and mumps. Each of these diseases can cause serious consequences, and immunization largely eliminates the risk of a child's suffering from the disease or its consequences.

2. Identifying Children To Be Screened. All children must have their immunization status checked at regular intervals. Those who do not have a regular source of health supervision are the most likely to be incompletely immunized.

3. Method of Screening for Immunization Status. Immunization status is checked by interviewing the parent or by reviewing records of immunization. Immunization records kept by parents or recorded in a medical chart can be accepted as valid. Verbal reports by parents are less valid but can often be accepted as evidence of immunization. The following interpretations are suggested:

- If the parent specifically recalls that at least three "baby shots" were given in the first six to nine months of life, it can be assumed that the DTP shots were given.

- If a parent remembers an oral polio vaccine being given, it can be assumed that it was given.

- The parent's recall of a "measles" shot may indicate either a measles or rubella (German measles) immunization. Unless the parent is certain which one was given, both must be repeated.

When information about past immunizations is very unclear or uncertain, the immunizations in question should be repeated. When the parent does not have a record of past immunizations, the information from the interview, as well as any immunizations given at the time of screening, should be recorded and given to the parent for future use.

The chart on page 101 indicates which immunizations are necessary for a child of a given age to be considered completely immunized. The column which matches the child's age should be selected. The child should have received each immunization indicated by a box in this column. The immunization may have been given at any time in the past, and once given, need never be repeated.

A 14-year-old child whose only diphtheria and tetanus immunization was a single DTP shot in infancy would require only two doses of Td to be considered "completely" immunized for tetanus and diphtheria. (It is not necessary or desirable to immunize for pertussis after age 6.) Similarly, a 6-year-old child who had received two doses of TOPV in infancy would require only a single further dose to be considered "complete."

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IMMUNIZATION (Each is given only once, not repeated)	Age at Evaluation 2-4 mos.	4-6 mos.	6-11 mos.	12-17 mos.	1½-5 yrs.	6-13 yrs.	14-21 yrs.
DTP #1*	☐	■	■	■	■	■	■
TOPV #1	☐	■	■	■	■	■	■
DTP #2*		☐	■	■	■	■	■
TOPV #2		☐	■	■	■	■	■
DTP #3			☐	■	-	-	-
TOPV #3			☐	■	-	-	-
Measles				☐	■	■	■
Rubella				☐	■	■	■
Mumps				☐	■	■	■
DTP after age 18 mos. (#3 or #4)					☐	-	-
TOPV after age 18 mos. (#3 or #4)					☐	-	-
DTP* after age 4 yrs. (#3, 4 or 5)						☐	-
TOPV after age 4 yrs. (#3, 4 or 5)						☐	■
Td within last 10 yrs.							☐

KEY

☐ Do at this age.

■ Do at this age if not done at previously scheduled age.

DTP = Diphtheria and tetanus toxoids combined with pertussis vaccine

Td = Combined tetanus and diphtheria toxoid (adult type)

TOPV = Trivalent oral poliovaccine

* Td if immunization is given at or after age 6 years.

4. Follow-up of Incomplete Immunizations. Any missing immunizations should be given as soon as possible, starting at the time of screening. Waiting for a separate referral will decrease the likelihood that immunizations will be completed. When several immunizations are missing, schedules such as those given below will aid in planning the best timing of the immunizations necessary to bring the child to a "completely immunized" status.

The schedule for routine immunizations is given below:

Age	Vaccines
2 months	DTP, TOPV
4 months	DTP, TOPV
6 months	DTP, TOPV
12 months	Measles, Rubella, Mumps
18 months	DTP, TOPV
4-6 years	DTP, TOPV
14-16 years	Td (continue every 10 years)

Children who did not receive immunizations in infancy can be rapidly immunized using the following schedules:

	AGE	
Time Interval	1-5 years	6 years and older
First visit	DTP, TOPV	Td, TOPV
1 month later	Measles, Rubella, Mumps	Measles, Rubella, Mumps
2 months later	DTP, TOPV	Td, TOPV
4 months later	DTP, TOPV	---
6-12 months later	DTP, TOPV	Td, TOPV
At age 14-16 years	Td (continue every 10 years)	Td (continue every 10 years)

Rubella vaccine should never be given to a post-menarchal girl unless: 1) serologic testing has shown that she is susceptible to rubella, and

2) suitable precautions have been taken to be certain that she is not pregnant and will not become pregnant for eight weeks following the vaccine.

5. Cost of Screening for and Updating Immunizations. Any person with brief training can review immunization records and interview parents, determine whether immunizations are complete, and plan a schedule for their completion. Such a review should, on the average, take two to four minutes per child.

Immunizations must be administered by a person who is completely familiar with the contraindications to each of the immunizing vaccines and with the proper techniques of intramuscular injections. Aides can easily be taught these skills, but some states may restrict administration of intramuscular vaccines to physicians and registered nurses. If an aide has checked the immunization status and prepared the proper vaccines for administration, a physician or nurse can check for contraindications and administer the injections with very little expenditure of professional time.

Whenever immunizations are given, the purpose and the type of immunizations should be explained to the parent, and the parent should be given a written record of the immunization.

The complete cost of all vaccines and other materials necessary to immunize an individual child from birth to age 21 is between 10 and 20 dollars.

Further Reading

For parents and children:

U.S. Children's Bureau. Infant Care and Your Child

from One to Six. U. S. Govt. Printing Office, Washington, 1973

For professionals and planners:

American Academy of Pediatrics. Report of the Committee on Infectious Diseases. 18th Ed., Evanston, Illinois, 1973. Available from the Academy, P. O. Box 1034, Evanston, Ill. 60204.

CHAPTER 12. SCREENING FOR DENTAL DISEASE AND CARE

1. Purpose and Rationale. The purpose of screening for dental disease in children is to assure that all children requiring dental care are receiving it. Before age three dental disease is relatively uncommon, and it can usually be detected in the course of a medical examination by a physician or nurse practitioner. After age three nearly all children have dental disease, and the concept of screening for dental disease becomes different from that for less common diseases. The purpose of screening children from ages three to 21 is not to identify dental disease, but rather to determine whether or not the child is receiving regular dental care.

Caries (cavities) is most common in the period through early adolescence. Periodontal diseases (diseases of the gums and the bones supporting the teeth) have their highest prevalence in adolescence and later. Since dental disease rarely corrects itself, but rather becomes progressively more serious, early treatment will nearly always be easier, less painful, less expensive and more successful than treatment begun at a later time.

2. Identifying Children Who Must be Screened. All children up to age three should have their mouths examined at each medical evaluation, and all children over age three should have an evaluation by

a dentist at least yearly.

3. Methods for Use in Screening for Dental Disease and Dental Care. Children from birth to age three should have their mouths examined by a physician or nurse practitioner concurrently with each routine health examination. The examiner should visually examine the palate and the dental ridge including any erupting teeth. The hard palate should be palpated for unsuspected clefts, and any incomplete closure of the soft palate should be noted. Any evidence of infection, bleeding or inflammation of the gums, malformation of the dental ridge, or malformation or decay of erupting teeth should be considered as a positive screening test, and the child should be referred for appropriate medical and dental care.

For all children between ages three and 21, the basic screening question is whether the child has had a dental evaluation within the last 12 months and whether any and all recommended treatment has been completed. Any child in this age group who has not had such care should be referred to a dentist or a dental program for diagnostic evaluation and necessary treatment. Medical examiners should continue to examine the mouths of children in this age group and make special referrals for those with obvious abnormalities.

4. The Meaning of a Negative Screening Test. In the process of screening for dental disease and care, every opportunity should be exploited to encourage parents to take the children for regular dental care and to encourage good habits of dental health. When questions about dental care reveal that the parents have already enrolled their child in a regular program of dental health supervision, the

parents should be praised and encouraged to continue their good work. When children's mouths are inspected, either in the zero to three-year group, or when older children are medically evaluated, all that can be said about a negative screen is that there are no obvious or severe defects, but the child will still need routine preventive care with annual evaluations.

5. Follow-up of Positive Screening Test Results. All children should be referred to a dentist who has expressed willingness to provide dental care for children. For children under age five, dentists with special interest in children should be selected for referrals.

6. Costs of Screening Procedures. An interviewer with only brief training can determine from a parent whether the child is receiving regular dental care.

A physician or a nurse engaged in the care of children can, with very little additional effort, include an adequate inspection of the palate, mouth, gums and teeth.

While most screening can be performed entirely by nonprofessional personnel, professional dental and medical personnel can incorporate nearly all of the screening into their routine health-care activities. When a physician in the course of his routine medical examination looks at a child's teeth, inquires whether there is a pattern of regular dental care and re-enforces or urges the establishment of such a program of care, he lends his professional credibility to the dental-care program.

Equipment or supplies other than those used in regular medical health supervision are not necessary or desirable for dental screening.

In a well-organized medical and dental care program, the additional cost of dental screening should be very low, though total dental care may be quite expensive.

Further Reading

For parents and children:

Do It. Order No. G41 (500 copies for $31.50)

Hagalo. Order No. G41S (Spanish) (500 copies for $31.50)

Do Your Gums Bleed When You Brush Your Teeth? Order No. G42 (500 copies for $36.90)

Casper and Space Age Dentistry. Order No. G47 (500 copies for $31.50)

A Visit to the Dentist. Order No. S-14 (500 copies for $112.10)

All of the above publications can be obtained from the American Dental Association, 221 E. Chicago Ave., Chicago, Illinois 60611.

For professionals:

American Dental Association. "Dentistry in National Health Programs: A Report with Recommendations" Journal of the American Dental Association, Vol. 83, pp. 569-600, Sept. 1973

Special Note: The plan for dental screening and referral must be developed in cooperation with the dentists practicing in the area of the screening program. The dental-care system is

usually quite separate from the medical-care system, and the physicians and other medical personnel capable of providing advice on the latter cannot speak for dentistry.

CHAPTER 13. SCREENING FOR EYE PROBLEMS

1. Purpose and Rationale. The primary objective in eye screening of children is to detect potentially blinding diseases and visual impairments which will interfere with the development and education of the child. Various aspects of the screening procedure are aimed at detecting the presence of congenital anomalies and malformations, eye diseases, amblyopia and refractive errors including astigmatism.

It is important to identify problems as early as possible for the following reasons:

- Ocular infections and injuries require prompt treatment to prevent possible visual loss.

- Conditions found in young children, such as congenital glaucoma and retinoblastoma, need immediate attention if vision, or even life, is to be saved.

- The presence of an ocular congenital anomaly is often associated with other evidence of disease which should be specifically looked for, perhaps through consultation with a physician specializing in diseases of the eye. While no curative treatment is available

for many congenital anomalies, the family can benefit from counselling and the child from rehabilitation services.

- Problems that cause suppression of vision in the eye (crossed eyes, high refractive errors, anisometropia, cataracts) can lead to unnecessary loss of vision (amblyopia or "lazy eye") in the affected eye if not detected and treated before the age of seven.

- Refractive errors even at an early age, may interfere with the vision needed for normal learning and thus merit early correction through eyeglasses.

Because a periodic professional eye examination for every child from infancy throughout the school years is not practical under current circumstances, and because these problems are not generally identified by parents or teachers, vision screening is employed to identify these problems as early as possible.

The prevalence of eye problems varies with the age of the children. The prevalence among infants and very young children is not known. The prevalence and distribution among preschool and school-age children is shown below:

	Preschool	School-age
Total number with problems	5%	25%
Types of problems:		
Refractive errors	68%	82%
Muscle imbalance	15%	5%
Amblyopia	15%	10%
Other	2%	3%

National Society for the Prevention of Blindness: Results of 1970-1971 Preschool Vision Screening Program and a School Vision Screening Program. Unpublished data.

2. Whom and When to Screen. All children should be screened at birth, six months, one year and every two to three years thereafter.

3. Method of Screening

a) Birth through one year

1) General external examination and evaluation of ocular motility
2) Gross visual acuity examination with fixation test
3) Testing light sense with pupillary light reflex test
4) Intraocular examination with ophthalmoscope

b) Two to five years

1) Visual acuity testing
Visual acuity for distance should be tested separately for each eye. The illiterate E test is the test of choice. Other tests which some consider to be at least equally effective are the STY-CAR (Screening Test of Young Children and Retardates) and the Allen picture-card tests. Children from two to five years of age should be tested at ten or fifteen feet, and those above five years should be tested at twenty feet.

Pass-fail criteria vary in different programs. Most agree that three- to six-year-old children who demonstrate a visual acuity of less than 20/40 in either eye or who demonstrate a one-line difference in visual acuity between the two eyes within the passing range deserve further evaluation. Four- and five-year-olds who fail to

demonstrate a visual acuity of 20/30 are also usually considered as "positive," "failed," or "abnormal."

2) Muscle imbalance
The parent should be asked whether the child's eyes ever turn in or out. The alternate cover test or the Hirschberg test (corneal light reflex) should be given. A parent's report that a child's eyes turn in or out, or a deviation of one of the eyes as revealed by the alternate cover test or the Hirschberg test, are generally considered to be positive findings.

3) Other
A general inspection of the eyes should be performed. Evidence of infection, congenital abnormalities, the presence of redness, discharge, enlarged or hazy cornea, obvious deviation of eye, excessive blinking, squinting and congested lids should all be considered as positive findings.

c) Five years and over

At a minimum, all children should be evaluated for distance visual acuity utilizing the illiterate E or the Snellen letters in a linear fashion. Criteria for positive findings* are as follows:

1) Five through nine years

Visual acuity of 20/40 or less. (The

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* National Society for the Prevention of Blindness: Vision Screening of Children, publication P-257.

inability to identify correctly the majority of letters or symbols on the "30" line of the test chart at the distance of 20 feet.)

2) Ten years and over

Vision of 20/30 or less. (The inability to identify the majority of letters or symbols on the "20" line of the chart.)

3) All ages

Children seven years of age and above should be presented with a line of letters rather than single letters since it is slightly more difficult to see one symbol in a line of symbols than it is to identify an isolated symbol. With such linear testing, a two-line difference between the eyes within the passing range is necessary before testing is considered abnormal.

A one-line difference between the two eyes within passing criteria using the isolated symbols method of testing, or a two-line difference with the linear method.

Children who wear glasses should be tested while wearing their glasses. If acuity is "normal" while wearing glasses, annual checkups should be recommended to ensure that acuity does not change and that glasses fit. If acuity while wearing glasses is abnormal, further evaluation is required unless a recent examination has ensured that the best possible correction has been achieved.

These basic criteria for referral may be modified by local conditions such as unavailability of care or lack of funds. The following tests, or others, may be added to the basic minimum procedure if recommended by a local advisory committee:

1) Plus lens test for hyperopia
   If a test for hyperopia is considered, the National Society recommends the plus lens distance vision test. (The near-vision test with cards held at 14 or 16 inches is not recommended as a screening procedure, and it is not a test for hyperopia.)

2) Muscle balance test

3) Depth perception test

4) Color discrimination test
   It is recommended that each child be given a color discrimination test at least once during his school years. Sets of pseudo-isochromatic plates in book form, such as the Hardy-Rand-Ritter Pseudoisochromatic Plates Test or the Ishihara Test are recommended.

Several companies produce binocular testing instruments which incorporate visual acuity, plus lens and muscle balance tests. Such machines are particularly useful in testing children six years of age and over. Before any equipment is purchased, those responsible for the vision screening program, particularly the eye specialists, should be familiar with the criteria to be used for referral. Personnel using these instruments should have special training in their use and maintenance.

d) Special considerations

To prevent unnecessary referrals careful attention should be given to the procedure and conditions for screening. Accurate test results depend upon the child's ability to comprehend instructions and to follow the instructions once they are understood. In the screening of preschool children, it is helpful to have parents practice the test with them beforehand. Children should not be tested when they are not feeling well, and they should be screened in a room that is free of distractions. Some preschool children become distracted when the testing distance is twenty feet. Shortening the testing distance to fifteen or ten feet is permissible, provided the appropriate chart is used with letters drawn to scale for the specified distance.

The Snellen chart should be placed upon a light-colored, uncluttered wall on which there are no windows unless all light from them can be shut out. It should be fastened securely so that the twenty-foot line is at the eye level of the average child to be screened. Bright colors surrounding the chart should be avoided.

The recommended illumination on the chart is from ten to thirty footcandles. A self-illumination unit should be the choice for distance testing whenever possible. This assures standard illumination evenly distributed over the chart. In the testing area, shadows and glare in the field of vision should be eliminated.

When the vision chart designed for testing at twenty feet is used, care should be taken in measuring the distance of twenty feet from the chart and marking the exact spot where the child is to stand or sit. When using the ten-foot chart, this distance should be marked.

Cards or construction paper cut with rounded corners can be used as eye occluders. A Michigan program used occluders shaped like rabbit ears. Paper cups may also be used. A lorgnette with a hole for one eye to see through is very successful when children are instructed to peek through the hole.

The compact stereoscopic table model instruments are very useful in testing school-age children. The instruments simulate the testing distance, which makes it possible to screen in small rooms. In addition, the tests control the lighting, they preserve confidential responses in the presence of other children, and they often allow more rapid screening.

4. Follow-up of Positive Screening Results. Children who fail the initial screening test should be rescreened on another day to be sure that the abnormal test was not due to temporary factors in the child or the testing environment. Children failing the second screening may be referred directly to an eye specialist or seen by their physician and then by a specialist. Test results should be interpreted to the parents, and the importance of an eye examination for those who have failed should be stressed. It is important to provide the referral specialist with the results of the screening test and to request a report of the specialist's findings. Follow-up efforts with the parents should continue until children obtain the recommended eye examination and the necessary correction or treatment. Children whose central vision is not sufficiently improved by lenses to pass the screening test obviously require a diagnostic evaluation.

5. Report to Parent When Screening Findings are

Negative. Parents should be told that the eye screening evaluation is not diagnostic and does not take the place of either diagnostic eye examinations or of refraction. At best the screening tests identify those with signs of eye defects; some children who need eye care will, however, be overlooked, while some will be referred who do not need professional eye care.

6. Screening Personnel.

a) Birth through one year

This evaluation should be performed by the pediatrician, family physician or other professional persons who are trained and experienced in recognizing eye disorders in infants.

b) Over one year

These children can be screened in a variety of settings by nurses, teachers, technicians, aides and volunteers. Since the tests require the cooperation of the child, it is important that the screener like children. The screener should also be meticulous and well trained.

Due attention must be given to the qualifications of the individual who instructs in the technique of screening. The National Society recommends, on the basis of observation of many programs with which it has been associated, that persons who provide this instruction should have the following qualifications: 1) supervisory experience in a successful ongoing program, 2) possession of basic information as to methods and objectives of vision screening, 3) demonstrated ability to teach others, 4) demonstrated capacity to work well with people, especially

with children. Didactic training can generally be accomplished in four to eight hours. Supervised practical experience with exposure to deviant eye screening results is also necessary.

Continued monitoring of the screening is very important in identifying persons who require further training. Yearly retraining is also recommended. Supervisors should determine whether there are state or local requirements for certification of screening personnel and ensure that they are met.

7. Time Required to Screen. Time varies according to age level, preparation of the child and the screener, and the general screening situation. In general, if a child comprehends the instructions, screening of one child can be accomplished within five minutes.

8. Cost of Screening Equipment. Snellen wall charts are available from the National Society for the Prevention of Blindness for $.50. Cover cards cost $.25 per set. Portable wall charts with built-in illumination range in price from $65 to $225. The stereoscopic instruments vary in price depending upon the make and the component parts. Generally, they range from $300 to $450.

9. Educational Material for Parents.

Available from the National Society for the Prevention of Blindness, Inc., 79 Madison Avenue, New York, N.Y. 10016:

Make Sure Your Child Has Two Good Eyes (G107)
Charlie Brown, Detective (G116)
Signs of Eye Trouble in Children (G102)
Your Eyes for a Lifetime of Sight (G510)

10. Training Materials.

Vision Screening of Children (P257)
Preschool Vision Screening (P253)
A Guide for Eye Inspection and Testing Visual Acuity of Preschool Age Children (P200A)
A Guide for Eye Inspection and Testing Visual Acuity of School Age Children (P200)
Signs of Eye Trouble in Children (G102)
Before We Are Six - A film
Teaching about Vision

The above are available from the National Society for the Prevention of Blindness, Inc., 79 Madison Avenue, New York, N.Y. 10016.

The Denver Eye Screening Test - Programmed instruction for nurses and paraprofessional personnel to teach the screening of infants and preschool age children by utilizing the illiterate E, Allen Picture Cards, Fixation test, Alternate Cover test and Hirschberg test, and to ask a parent if a child's eyes are not straight. Materials consist of a manual/workbook, film practice exercises (for instance, scoring the cover test and Hirschberg test from a film) and a test of proficiency. Available for rent or purchase through LADOCA Project and Publishing Foundation, Inc., East 51st Avenue and Lincoln Street, Denver, Colo. 80216.

Identification of School Children Requiring Eye Care (Report #7). Reprints available from the American Association of Ophthalmology, 1100 17th Street, N.W., Washington, D.C. 20036.

Eye Cues for Eye Care. Available from the American Association of Ophthalmology, 1100 17th Street, N.W., Washington, D.C. 20036.

Wilson, C.C. (ed.) "Eyes and Vision Screening" Chapter 4 in School Health Services, page 71. American Medical Association and National Education Association, 2nd Ed., 1964. Available from AMA, 535 North Dearborn Street, Chicago, Illinois 60610.

"The Two-foot World of Paul Jackson" - a film discussing vision. Available from the Michigan Department of Public Health, 3500 North Logan Street, Lansing, Michigan 48914.

Directions for the alternate cover and cover-uncover test are available from the Michigan Department of Health at the above address.

References and Additional Reading

Blackhurst, R.T. Successful Preschool Vision Screening in Michigan. Journal of Michigan State Medical Society, 61:1124, 1962

Blackhurst, R.T. and Radke, E. School Vision Screening in the State of Michigan. The Sight-Saving Review, 34:1, 1964

Costenbader, F. and O'Neill, J.F. Ocular Examination before the Age of Four Years. The Sight-Saving Review, 38:140, 1968

Hatfield, E.M. Progress in Preschool Vision Screening. The Sight-Saving Review, 37:194, 1967

Hatfield, E.M., Barrett, C.D. and Nudell, R.J. Detroit Project 20/20. The Sight-Saving Review, 37:202, 1967

Lippmann, O. Eye Screening (Special Review). Archives Ophthal. 68:692, 1962.

CHAPTER 14. SCREENING FOR HEARING

1. Purpose and Rationale. The aim of auditory screening is to identify children who have reduced hearing sufficient to interfere with their social and educational contacts and responses. More specifically, the aim is to detect central auditory problems, sensorineural hearing losses and conductive hearing impairment at the earliest possible age when optimum remediation can be achieved.

Normal hearing, particularly during the first years of life, is essential to learning; perhaps it is the most important avenue of learning, since without the perception of sound, one cannot learn speech. Speech is the basis for language and for the other communication skills of reading and writing. Hearing impairment, therefore, may impair normal intellectual function, as well as interfere with the perception of a person's environment. Impaired communication due to undetected mild or moderate hearing losses may result in a child's being mislabeled as a slow learner or mentally dull and may also result in secondary emotional problems. Auditory screening is designed to detect hearing losses as early as possible in an attempt to prevent these complications and allow for optimum care and remediation.

The prevalence of congenital hearing losses is approximately one in 1,000. If one excludes the children having obvious anatomical abnormalities, the prevalence is approximately one in 2,000. The

prevalence of conductive hearing losses varies with the economic status of families; it is more common among the inner-city populations who live in more crowded situations. The prevalence also varies with age, being higher during the first few years of school than during the later school years. On the average, the prevalence among two- to five-year-olds is ten percent. Among school-age children the prevalence varies from two to ten percent.

2. Whom to Screen. Ideally, all children should be screened according to the following schedule: birth, 6, 12, 18 and 24 months; 3, 4, 5, 6 and 8 years, and every two to three years thereafter. When children were screened frequently from the first to the twelfth grade, about 85 percent of all the ultimate hearing losses were identified by the five, six, seven and eight year examinations.

3. Method of Screening.

a) Birth

It is recommended that newborns be evaluated with a medical history and a physical examination which notes the following: 1) family history of hereditary childhood hearing impairment; 2) rubella or other nonbacterial intrauterine fetal infection (e.g., cytomegalovirus infections, Herpes infection); 3) defects of ear, nose or throat such as malformed (low-set or absent) pinnae, cleft lip or palate (including submucous cleft), or any other abnormality of the otorhinolaryngeal system; 4) birthweight below 1500 grams; 5) serum bilirubin greater than 20 mg./100 ml. and 6) bacterial meningitis. Any newborn who manifests any of these abnormalities

is considered to be positive or suspect. Such infants should be tested audiologically within two or three months after birth and retested at intervals thereafter. Auditory testing of babies in the newborn nursery is not currently recommended except for purposes of research.

b) Six months through 24 months

It is recommended that an infant's ability to hear and to respond verbally be evaluated by utilizing the series of parent-answered questions presented at the end of this chapter. The infant's failure to make all of the auditory responses appropriate for his age constitutes a positive response which should be rescreened a month later. If still positive, the child should be referred to an audiologist. If possible, the infant's ability to hear should also be ascertained during this age period through the use of calibrated noisemakers according to the methods described by Hardy[3] or Murphy[4]*.

c) Three to 21 years of age

It is recommended that children three years of age and over be evaluated using pure-tone audiometry testing each ear at 1,000, 2,000 and 4,000 Hz at 15 dB ANSI if the ambient (environmental) noise level is low enough. If the ambient noise level is not very low, testing at 25 dB is recommended. A positive response is a failure to respond to the 15 or 25 dB tone at any two frequencies for either

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*See References and Additional Reading at the end of this chapter.

or both ears. Some three-year-olds may require play-conditioning audiometry to determine whether or not they hear the auditory signals. After age five, testing at 500 Hz should be added and for children over age 11 testing at 6,000 and/or 8,000 Hz is also recommended to identify the higher frequency cochlear losses that occur more frequently at that age.

Care should be taken to reduce the ambient noise as much as possible. This can be done by selecting a room that is removed from noisy waiting rooms, water pipes and street noises. The use of floor carpeting and drapes can do much to minimize the ambient noise level. Accurate calibration and function of the audiometer is essential to achieve accurate audiometric screening. This can be done by having the manufacturer recalibrate the instrument at least yearly and more frequently by testing a person with known normal hearing at 0 dB. This is generally done by having the screener perform a self-test before starting to screen. If it is possible to orient the child and his or her parents to the auditory screening test prior to the actual testing, the screening process may be shortened.

4. Follow-up of Positive Screening Results.

a) Newborns

Newborns with a history suggesting the likelihood of deafness should, in addition to receiving necessary medical supervision, be further evaluated by an audiologist in a soundproof room at four, eight and twelve months to rule out a hearing loss.

b) Six to 24-month-old infants

If screening findings are positive, the child should be rescreened one month later, and if still positive, the child should be given a complete medical history and a physical examination. If no apparent cause, such as otitis media, is detected the child should receive an otolaryngologic evaluation.

c) Children three years of age and over

Children who are found to be positive on the pure-tone audiometric screening evaluation should have their ears checked to rule out wax in the external auditory canal. If the canal is not occluded by wax, the child should be rescreened two to four weeks later to rule out transitory hearing losses which frequently occur secondary to an upper-respiratory infection. If upon rescreening the findings are still positive, the child should be thoroughly evaluated by the physician and referred to an audiologist for a hearing evaluation and possibly additional evaluations by an otolaryngologist.

5. Report to Parent When Screening Findings are Negative. The parent may be told that the child performed adequately on the hearing screening evaluation and that the evaluation will have to be repeated at various future times to be certain the child has not developed a hearing loss.

6. Screening Personnel.

a) Newborn

This evaluation, which rests upon a history

and a physical examination, is best performed by a physician, a nurse or a pediatric nurse practitioner.

b) Infants and older children

These can be screened by a nurse, an office assistant, an audiometrist or a volunteer after the screeners have received training and sufficient screening experience.

7. Time Required to Screen.

a) Newborn

This takes about 15 minutes. The major time requirement is for the performance of the physical examination.

b) Infants

This requires two to five minutes, depending upon whether one relies solely upon the questionnaire or also utilizes the calibrated noisemakers.

c) Preschool-age children

The times vary between three and five minutes, depending upon how readily the child will respond.

d) School-age children

An average of one to two minutes per child is required to perform the actual sweep test.

8. Cost of Screening Equipment. Calibrated noisemakers cost a few dollars. Audiometers vary in cost from $300 to $500. Audiometers with only one earphone are not recommended. Since audiometers are delicate instruments which require periodic servicing, it is important to buy a good model which has local servicing facilities or a local dealer.

9. Educational Materials for Parents. The Alexander Graham Bell Association for the Deaf, Inc., The Volta Bureau, Washington, D.C. 20007, has an extensive stock of parent education materials.

10. Training and Reference Materials.

a) Audiometric Screening for Infants

A 16 mm., 16-minute film which teaches the use of noisemakers by means of the Hardy Technique. Available for rent or purchase from Bureau of Health Information, Maryland State Department of Health, 301 West Preston Street, Baltimore, Maryland 21218.

b) The Denver Auditory Screening Test

Programmed instruction for nurses and paraprofessional personnel to teach play-conditioning audiometry and the use of the audiometer. Materials consist of a manual/workbook, a film, practice exercises and a test of proficiency. Available for rent or purchase through LADOCA Project and Publishing Foundation, Inc., East 51st Avenue and Lincoln Street, Denver, Colorado 80216.

Questions for Parents of Infants

6 Months through 24 Months

By four months does your baby:

1. Stir or awaken when he* is sleeping quietly and someone talks or makes a loud noise? (The baby doesn't always have to do this, but you should be able to notice it occasionally.)

2. Sometimes start or jump when there is a very loud sound, like a cough, a dog bark or a dish falling to the floor?

By seven months does your baby:

1. Turn his head toward a sound or when his name is called when he cannot see you?

2. Stir or awaken when he is sleeping quietly and someone talks or makes a loud sound?

3. Sometimes start or jump when there is a very loud sound?

By nine months does your baby:

1. Directly find a sound made at his side, or turn his head when you call him from behind?

2. Stir or awaken when he is sleeping quietly and someone talks or makes a loud sound?

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* To avoid repetition of the awkward phrases "his or her," "him or her" and "he or she," we have used "his," "him" and "he."

3. Sometimes jump or start when there is a very loud sound?

By twelve months does your baby:

1. Turn his head in any direction and find an interesting sound or the person speaking?

2. Begin to repeat some of the sounds you make?

3. Stir or awaken when he's sleeping quietly and someone talks or makes a loud sound?

By two years does your baby:

1. Point to at least one part of his body (eyes, feet, etc.) when you tell him to, without his seeing your lips?

2. Point to the right picture if you ask, "Where's the cat?" (or dog, or man or horse) without his seeing your lips?

3. Give you a toy when you ask him to, or put a block on the table or chair when you ask him to, without his seeing your lips?

References and Additional Reading

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5. Northern, J. and Downs, M. Hearing in Children Williams and Wilkins Co., in press, 1974

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CHAPTER 15. GROWTH ASSESSMENT

1. Purpose and Rationale. Growth assessment is used as a screening device for a general appraisal of the child's state of health.

Periodic growth screening may help detect diseases or conditions which interfere with normal growth and lead to their prompt treatment. For instance, if growth is impaired because of undernutrition or neglect, appropriate treatment may be prescribed to confront the underlying problem. Normal growth assessment may provide the reassurance which parents need about the normal health of their child.

The prevalence of growth problems depends upon the definition. For instance, many parents are concerned about the growth of their children when the child actually does not have a growth problem but rather, reflects shortness of stature due to genetic endowment or delayed onset of puberty.

The prevalence of parental concern about a child's growth is relatively high, particularly during infancy. During adolescence, children themselves as well as their parents often show great concern. Prevalence data on growth problems secondary to chronic disease or severe malnutrition are not available at this time. However, it is well established that the level of nutrition varies inversely with economic status and that low-income children are generally smaller than more affluent children.

2. Whom to Screen. All children's growth should be assessed at the time of birth and at least every three months thereafter until one year of age, after which it should be assessed yearly. Ideally, the child would be measured whenever he or she is seen for a health evaluation at one, two, four, six, twelve, eighteen and twenty-four months of age followed by a yearly re-evaluation.

3. Method of Screening. The head circumference should be measured with a tape measure of 1/4" to 3/8" width, constructed either of metal or of plastic. Cloth should not be used, since it frequently stretches. Most of the growth of the head occurs during the first few years of life, and so head circumference need not be measured routinely after two or three years of age.

Weight should be measured at all ages with the child nude or wearing only undergarments. Under no circumstances should children be weighed while they are wearing their shoes. To assure correct conclusions about a child's rate of growth, it is important to be consistent in the manner in which repetitive measurements are made. Therefore, a similar amount of clothing should be worn by the child whenever weight measurements are taken. Balance scales, which are the most accurate and yield the most consistent results, should be used, and they should be properly calibrated (set at zero before starting).

Up to two years of age, infant's stature should be measured as recumbent length using a properly constructed board. From two years of age on, it is best to measure stature as standing height. This can be done using a vertical measuring board (such as a yardstick) or a fixed wall device.

All measurements should be plotted graphically on

growth charts. Unfortunately, at this time ideal growth standards for various population groups are not available. In the meantime, the Composite International and Interracial Head Circumference Graphs (available from Mead Johnson Company, Evansville, Indiana), Iowa Growth Charts (available from Order Department, Sidwell Building, University of Iowa, Iowa City, Iowa) and the Harvard Growth Charts (Mead Johnson Company, Evansville, Indiana, or Medical Director, Ross Laboratories, Columbus, Ohio) are readily available. Use of such charts makes it possible to ascertain the growth percentile rating and to compare current measurements with previous measurements and to determine rate of growth.

Most children remain in their percentile groups. If the child's measurements are between the third and the ninety-seventh percentile and if the child's growth rate has not changed (increased or decreased) by more than twenty percentile points, growth is considered to be normal. If the measurement is above the ninety-seventh percentile or below the third percentile or if the rate of growth has changed more than twenty percentile points, the examiner should seek to determine the causes for this deviation.

4. Special Considerations. Since measurements are compared with previous measurements, it is essential that all measurements be made in a systematic manner. To obtain accurate recumbent length measurement, it is best to have two people perform the measurement. One person holds the head while the other straightens the leg prior to taking the measurement(4).

5. Follow-up of Positive or Equivocal Screening Results. Children whose measurements fall outside the limits stated above or seem inconsistent with

previous records, should have the measurements rechecked to ensure their accuracy. Common causes of a discrepancy include use of a maladjusted balance scale, failure to measure the child undressed, and incorrect recording or plotting of measurements. If, upon rechecking, the abnormal findings are confirmed, the child's growth should be reassessed one to three months later and again plotted upon the charts. If, upon rechecking at a later time, the growth findings are still abnormal, i.e., indicate abnormal growth, a more complete medical evaluation should be carried out with special attention to: birth measurements, diet history, current and intercurrent illnesses; a careful system review in search of gastroenteric, renal and cardiac abnormalities; a family history including information on growth or actual measurements of family members, and a careful physical examination. Complete blood count and urinalysis may also be indicated.

6. Report to Parent When Screening Findings are Negative. If the growth measurements appear to be normal, the parents and the child should be told so. It is also helpful to point out to the parent that it is important to periodically reassess growth in the future.

7. Screening Personnel. Anyone who likes children and who is meticulous can learn to make accurate growth measurements. The time required to train a person is half an hour. Preferably, this training would also include a few hours of practical experience, particularly in measuring infants.

8. Time Required to Screen. Depending upon the child's age and his cooperation, between three and five minutes are required to measure a child and to plot measurements.

9. Cost of Screening Equipment. The following are approximate costs:

Metal Tape Measure	$1.00 - $2.00
Infant Balance Scales	$55.00
Balance Scales for older Children and Adults	$95.00
Measuring Board and Stature Measurer	$80.00 - $100.00

References and Additional Reading.

1. The Creation of Growth Standards; A Committee Report. Amer. J. Clin, Nutr. 25:218, 1973

2. Falkner, F. Office Measurement of Physical Growth. Pediat. Clin. N. Amer. 8:13, 1961

3. Falkner, F. Physical Growth. Chapter 4 in Barnett, H.L. (ed.) Pediatrics, pp.233-251, N.Y. Appleton-Century Crafts, 15th Ed. 1972

4. Owen, G.M. Assessment and Recording of Growth of Children: Report of a Small Conference. Pediat. 51:461, 1973

CHAPTER 16. DEVELOPMENTAL SCREENING

1. Purpose and Rationale. The aim of developmental screening is the identification of children who have significant deviations in psychological, neurological or emotional development. Some such deviations are amenable to specific therapy; for others the chief objective is guidance for the child and the family to maximize the developmental potential, provide proper educational placement and prevent the occurrence of secondary problems. Developmental impairments generally fall into one or more of the following categories: mental subnormality, either organic or environmental; seizure disorders; neuromotor disabilities; school learning problems, and severe emotional disturbances.

Since identification without treatment can create further problems, careful consideration must be given to how children identified as deviant will be cared for. Screening can be undertaken at several levels: through questionnaires completed by parents or a health aide; with screening tests given by nonprofessional personnel; or by nurses and physicians at the time of routine pediatric visits.

Screening for neuro-psychological deviations can insure detection of children with such deviations, and in turn, may set in motion procedures facilitating prompt and effective treatment aimed at eliminating or minimizing the effects of the difficulties. Once the identification of children having

developmental problems takes place, it is also possible to identify the cause of the deviation and to develop specific treatment programs. For instance, the treatment of a child who is delayed in his development due to a thyroid deficiency differs markedly from the treatment of a child who is delayed due to environmental deprivation, abuse or neglect. Since early development forms the basis for successful later development, it is important to identify and treat these handicaps as early in the life of the child as possible. Furthermore, the longer these problems are not corrected, the more difficult and expensive they are to treat.

In some cases there is no specific treatment for a child's disability. However, even in such cases a better parental understanding of the child's developmental strengths and weaknesses can do much to avoid secondary emotional problems. Furthermore, an understanding of the child's disability and its later consequences in terms of special education may do much to help the family make realistic plans for the future.

The prevalence of developmental disabilities in the population varies with the definition of what constitutes such a problem, and with population characteristics such as age and economic status. If one defines a developmental problem as the failure of a child to develop sufficiently to cope with his environment, the group defined includes this nation's six million children (three percent) who are mentally retarded, the children failing in school and the emotionally disturbed. Most of the retardation diagnosed before two years of age is of an organic etiology. Developmental problems such as school failure arising in later years are apt to be of an environmental rather than an organic origin.

Fourteen percent of school-age children have been found to have emotional problems requiring treatment. (Of these, 0.6 percent are psychotic, 2 to 3 percent are severely disturbed, and 10 percent have less severe emotional problems.)

Therefore, the combined group of mentally retarded, seizure disorders, neuromotor disabilities, school learning problems and emotional disturbances exceeds 17 percent of children, a percentage that is higher than most other conditions, such as anemia, tuberculosis, etc., for which one may screen.

This prevalence is to some extent also influenced by the age, economic status and expectations of the population being screened. Various studies have demonstrated that the prevalence of children with developmental delays increases with age as children are expected to learn more. There is also generally an inverse relationship between family income and the prevalence of developmental problems such as mental retardation (i.e., the lower the family income, the greater the prevalence of school failure).

Screening should be undertaken only if community resources are available or can be developed to diagnose and treat suspected problems. If a community which lacks such resources wishes to utilize screening results to demonstrate the need and to provide the impetus for developing additional diagnostic and/or treatment services, the public should be so informed beforehand to prevent false parental hopes of obtaining such services for their children immediately.

2. Whom and When to Screen. Since the above mentioned disabilities may present themselves at any time in the life of a child and since treatment is

usually of greatest benefit when started at the earliest possible time, it is recommended that developmental screening, like growth assessment, be repeated throughout infancy and childhood. Ideally, children should be screened developmentally whenever they are seen for a health examination. To make this approach practical, it is proposed to screen primarily with a developmental questionnaire and to supplement the questionnaire with a screening test at periodic intervals. The questionnaire should be utilized whenever the child is seen for health assessment. The screening test, which is more accurate but more time-consuming, should be administered when children reach nine months of age and again between three and five years of age. From five years of age through adolescence, a developmental questionnaire at three-year intervals is also recommended. (Efforts should always be made to use culture-fair screening procedures.)

A history of a complicated pregnancy (such as premature birth, small for gestational age, maternal infection, etc.), a family history of developmental disabilities, or the presence of birth defects would place a child in a high risk group. Such children should be screened with a questionnaire at each health supervision visit and evaluated with a developmental screening test at six and twelve months, and at two and three years of age.

3. Method of Screening for Developmental, Seizure and Academic Problems.

a) Infants and preschool children

The method of screening recommended here is a two-stage procedure. The first is a history questionnaire and the second a more accurate developmental screening test.

1) Screening with a questionnaire. Numerous questionnaires are available. Two commonly used are the Developmental Questionnaire* and the Rapid Developmental Screening Checklist[4]*. The former has more questions at each age level and therefore is probably more sensitive.

   Screening for seizure disorders such as the inapparant psychomotor seizures, as well as the more obvious grand mal and petit mal seizures can best be accomplished through the use of a series of questions which are specifically designed to detect seizures. The Developmental Questionnaire includes such questions.

2) Screening with an observational test. It is recommended that these tests be employed to identify the children who inadvertently were missed with the less accurate questionnaires. These tests differ from the diagnostic tests in two ways. First of all, they are simpler and can therefore be administered by non-professional personnel; secondly, they are quicker to administer and score than the more detailed diagnostic tests which are generally administered by psychologists and some pediatricians. It is recommended that one or more of the following tests be employed: (1) Developmental Screening Inventory - birth to 18 months[6], and 18 to 36 months; (2) Denver Developmental Screening Test - birth to six years[3]; (3) Goodenough

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* See page 149 for sources of these tests.

Harris Drawing Test - recommended five years and over; (4) Slosson Intelligence Test - recommended four years and over; (5) Wide Range Achievement Test - recommended for six years and over*. It is suggested that one of these tests be administered routinely to all children at nine months of age and between three and five years of age, whether or not they were suspect on the developmental questionnaire. In addition, the use of one of these tests is recommended for all children who are suspect on the basis of the questionnaire to decrease the likelihood of unnecessary over-referrals. If one of the tests is used as a follow-up of suspect findings on the questionnaire, the screening test is best administered within a few weeks, rather than waiting for the child to reach nine months or three to five years of age. Screening with tests is also recommended for more frequent use with high risk children when they reach six and twelve months and two and three years.

b) School-age children

School learning problems may be identified by obtaining a school report. If the parent is considered to be aware of the child's progress and considered to be an accurate reporter, a parent report of school performance may be utilized instead of a report from the school. An alternative to either of these two reports is to administer either

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* See page 150 for sources of tests.

the entire Wide Range Achievement Test (WRAT) or to administer only the reading subscale of the WRAT.

4. Method of Screening for Emotional Problems. Though screening for severe emotional problems is widely recommended, there are few screening procedures which have been validated. The newborn questionnaire developed by Broussard[2] has been shown to differentiate between groups of children with higher or lower risks. Other procedures which have been widely employed though not validated include the Academic Progress Chart[8], the procedure developed by Bower[1] and the questionnaire developed by Harth and Glavin[5]. Since so little validity data are available pertaining to these procedures, no particular procedure is recommended at this time. Rather, it is recommended that for each program the local psychologists and/or psychiatrists who may be asked to diagnose and to treat the screened children, consider the above procedures, as well as others before deciding which procedure is best suited for their local situation.

Summary of Suggested Schedule

Screening for Developmental Disabilities:

1) Questionnaire	All children whenever seen for a health appraisal
2) Screening Test	All children at 9 months, 3 to 5, 8 and 11 years (school report or test at age 8 and 11). Children at risk - at 6 and 12 months, 2 and 3 years

Screening for Emotional Problems:
Procedure to be decided by local psychologists and/or psychiatrists.

5. Special Considerations.

a) Any screening program dealing with learning disabilities and psychological or mental health problems should have a policy on confidentiality of records to protect the children being screened.

b) It is important that tests be appropriate for the children being tested and that they be culture-fair. For example, children should not be tested in a language that is unfamiliar to them. Frequently the question is raised about the use of tests standardized on a local population in a place of national norms. Experience to date has suggested that local norms are more useful in understanding why a given child may be slow rather than in predicting how this child will perform in the future. Though predictive data are often available for national norms, such data are rarely available for local norms. The Developmental Screening Inventory and the Denver Developmental Screening Test have been found to be appropriate both for non-minority and for minority children. When screening minority children, the latter test generates approximately three to four percent referrals, a percentage which does not differ significantly from non-minority children.

c) There is a tendency for screening personnel to over-interpret slight development deviations because they fail to realize that slight delays are common in normally developing children whose development is not as smooth and regular as the charts and standards seem to imply. Such over-interpretation may result in undue parental concern and in the implementation of treatment programs which are not only unnecessary and expensive but indeed may be harmful to the child and his family.

6. Follow-up of Positive Screening Results. It is recommended that children suspected of being slow on any of the questionnaires be further screened with one of the screening tests. Children who on the basis of the screening test are found to be borderline or abnormal (suspect) should receive a complete medical history with a special emphasis on questions related to causes of developmental delays (complications of pregnancy, illnesses such as meningitis, etc.) and a thorough social history. In addition, these children require a physical and neurological evaluation. Further diagnostic developmental, psychological and/or psychiatric evaluations performed by specialists trained to evaluate children of that age are necessary to avoid the pitfall of over-diagnosis and over-treatment. Hearing and vision evaluations are frequently also indicated. If resources are limited, one may elect to refer only the most deviant children to assure that the children most in need of special services actually receive such services.

Children suspected of having emotional problems will require the same type of history, physical examination and neurological evaluation as recommended for the child with a developmental deviation. The social and emotional development of the child must also be thoroughly explored and followed by a psychological and/or psychiatric evaluation. Similarly, children suspected of having seizure disorders should also receive a thorough medical history, physical examination and neurological evaluation, as well as an electroencephalogram.

7. Report to Parents When Screening Findings are Negative. Parents whose children have normal tests may be reassured that their child's development is within normal limits and that barring unforeseen circumstances the child's development is likely to

continue to be within normal limits. However, periodic rescreening is recommended to detect the rare child whose deviation does not become apparent until a later age.

8. Screening Personnel. The questionnaires may be self-administered by parents or administered by an aide, depending upon the questionnaire and the parents' ability to read. The developmental screening test can be administered by an aide, nurse or technician who has been properly trained in the administration of the test.

9. Time Required to Screen. Questions pertaining to development seizures and emotional problems may be answered in approximately 15 to 20 minutes. The screening tests generally require the times listed below:

Testing Time and Cost of Test Equipment

	Time Required in Minutes	Cost of Test Kit and Manual
Denver Developmental Screening Test	15 - 20	$8.50
Developmental Screening Inventory	10 - 30	2.50
Slosson Intelligence Test	20 - 30	3.75
Goodenough-Harris Drawing Test	15 - 30	6.50
Wide Range Achievement Test	5	7.50

10. Cost of Screening Equipment. The costs represent the cost of instructions, equipment and limited number of recording forms. Additional forms are available at a much lower cost.

11. Educational Materials for Parents.

Spock, Benjamin; Baby and Child Care, Pocket Books, New York

Ginott, Hiam; Between Parent and Child, Macmillan, New York, 1965

12. Sources for Questionnaires and Tests.

Questionnaires:

Developmental Questionnaire (birth - 36 months)
Hilda Knobloch, M.D.
Albany Medical College
Albany, New York 12208

Rapid Developmental Screening Checklist (1 month - 5 years)
Margaret Giannini, M.D.
Mental Retardation Institute
New York Medical College
Valhalla, New York 10595

Tests:

Denver Developmental Screening Test (birth - 6 years)
LADOCA Project and Publishing Foundation, Inc.
East 51st Avenue and Lincoln Street
Denver, Colorado 80216

Developmental Screening Inventory (birth - 18 months, 18-36 months)
Source same as Developmental Questionnaire.

Goodenough-Harris Drawing Test (recommended for 5 years and over)
Harcourt, Brace & World, Inc.
7575 Third Avenue
New York, New York 10035

Slosson Intelligence Test (recommended for 4 years and over)
Slosson Educational Publications
140 Pine Street
East Aurora, New York 14052

Wide Range Achievement Test (6 years - adulthood)
Guidance Associates
1526 Gilpin Avenue
Wilmington, Delaware 19806

13. Training Materials.

Films on Developmental Evaluation:

Developmental Evaluation in Infancy. A teaching film in two parts. H. Knobloch, B. Pasamanick and E. S. Sherard (Part I - Adaptive and fine motor behavior, 1500 feet. Part II - Gross motor behavior, 650 feet).

The Gesell Developmental and Neurological Examination at 16, 28, 40 and 52 Weeks of Age. A teaching film. H. Knobloch, B. Pasamanick and E. S. Sherard.

Normal and Abnormal Neurologic Function in Infancy. A teaching film. H. Knobloch, B. Pasamanick and E. S. Sherard.

These films can be purchased or rented from the Department of Photography and Cinema, 156 West 19th Avenue, The Ohio State University, Columbus, Ohio 43210.

Rapid Developmental Screening Checklist by Margaret Giannini, available from Mental Retardation Institute, New York Medical College, Valhalla, New York 10595; Attention: Media Department.

Denver Developmental Screening Test and/or Programmed instruction for nurses and paraprofessionals. The programmed instruction consists of a manual/workbook, a film, homework assignments and a test of proficiency. Available from LADOCA Project and Publishing Foundation, Inc., East 51st Avenue and Lincoln Street, Denver, Colorado 80216.

References and Additional Reading

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2. Broussard, E. and Hartner, M.: Further considerations regarding maternal perception of the firstborn. J. Hellmuth (ed.) Exceptional Infant, Vol.2, Studies in Abnormalities, pp. 432-449. Brunner-Mazel, Inc. New York, 1971

3. Frankenburg, W. K., Goldstein, A.D. and Camp, B.W.: The Revised Denver Developmental Screening Test: Its Accuracy as a Screening Instrument. J.Pediat. 79:988, 1971

4. Giannini, M.J.: Rapid Developmental Screening Checklist. Published by American Academy of Pediatrics, New York Chapter III, District II, 1971

5. Harth, R. and Glavin, J.P.: Validity of Teacher Rating as a Subtest for Screening Emotionally Disturbed Children. Excep.Child. 37:605, 1971

6. Knobloch, H., Pasamanick, B. and Sherard, E.S.: A Developmental Screening Inventory for Infants. Pediat. 38:1095-1108, 1966

7. Meier, J.: Screening and Assessment of Young Children at Developmental Risk. President's Committee on Mental Retardation. DHEW Pub.#(05) 73-90, 1973

8. Stringer, L. A. and Glidewell, J.C.: Early Detection of Emotional Illnesses in School Children. Final report, St. Louis County Health Dept. April 1967

CHAPTER 17. SCREENING FOR TUBERCULIN SENSITIVITY

1. Purpose and Rationale. The purpose of screening for tuberculin sensitivity is to prevent disease due to infection with the tubercle bacillus. This can be accomplished by detecting infected persons and treating them before they develop disease and also by detecting diseased individuals and treating them so that they cannot spread infection to others.

Children who are infected with the tubercle bacillus develop tuberculin sensitivity, which can be detected by skin testing. Unless they are treated, a proportion of such infected children will develop the disease, tuberculosis, usually many months or years later. Through tuberculin skin testing, such persons can be identified and given prophylactic treatment which will prevent disease from developing. Skin testing will also detect individuals with unsuspected disease so that they can be treated. Detecting a tuberculin-sensitive child can also lead, through the investigation of those in contact with the child, to the detection of the person who has transmitted the infection to the child.

2. Whom to Screen. The prevalence of tuberculosis infection in children is so low in many communities that routine tuberculin testing of all children can no longer be recommended. The number of new cases of tuberculosis in the United States in 1972 is

shown in the following table.

New Cases of Tuberculosis
in the U.S. in 1972

Reported New Cases of Disease	AGE IN YEARS 0 - 4		5 - 14		15 - 24	
	N	I	N	I	N	I
White Males	365	4.9	264	1.6	769	4.7
White Females	326	4.6	222	1.4	667	4.1
Non-White Males	369	26.6	364	11.7	752	28.4
Non-White Females	314	22.6	361	11.7	699	25.9

N = number of new cases
I = incidence rate per 100,000 population
Source: Center for Disease Control

It is noteworthy that the incidence of tuberculosis is approximately six times higher among non-whites than among whites for each of the three age categories.

Two groups of children still deserve routine periodic testing:

- all children who have had contact with a known case of tuberculosis

- all children living in neighborhoods or communities in which the prevalence of tuberculin sensitivity in school-age children is known to exceed one percent (100/100,000).

Children (and other persons) who have had contact with a person with active tuberculosis should be tested immediately, retested in three to six weeks, and then tested every three months or until contact with the known case has been terminated for three months.

Children living in communities in which the prevalence of tuberculosis sensitivity in school-age children is one percent or higher should be tested at age nine to twelve months, at age three to five years, or at school entry and at age 11 to 14 years. Children in these communities who have not been tested at the recommended ages should be tested at the first opportunity. If the prevalence of tuberculin sensitivity among school children in the community exceeds two percent, all children should be tested annually, beginning at age 10 to 12 months.

If the prevalence of tuberculin sensitivity among school children in a community is unknown, the EPSDT program should cooperate with the health department in a survey of school children, or of all school-age children enrolled in the EPSDT program.

3. Methods for Use in Screening for Tuberculin Sensitivity. In any survey, or when skilled personnel are available for testing in schools, the intradermal Mantoux test should be used, with a dose of 5 tuberculin units of intermediate strength P.P.D.

When testing is to be performed in physicians' offices or clinics, one of the multiple puncture tests (Tine, Monovac or Heaf) may be substituted for the more cumbersome and difficult Mantoux test. Multiple puncture tests have the advantage of convenience of storage and easy rapid application requiring only simple skills. The Mantoux test is more specific and sensitive, but requires freshly prepared, carefully preserved P.P.D. solution, and skillful intradermal injections.

The site of the skin test must be examined two to four days after its application. Reactions before 48 hours are not significant if they do not persist. The following criteria are used in interpreting the

skin test; in all instances only induration (swelling that can be felt by the examiner) is meaningful. Redness without induration is ignored.

	Diameter of Induration	
	Mantoux Test	Multiple Puncture Test
Negative reaction	$<$5 mm	$<$2 mm
Doubtful reaction	5-9 mm	$\geq$ 2 mm
Positive reaction	$\geq$ 10 mm	Vesiculation

For multiple puncture tests, measure the size of the largest papule if several are present. All persons with doubtful reactions by multiple puncture test should be retested using the Mantoux technique and treated according to the result of the Mantoux test.

4. Special Considerations. P.P.D. solution for the Mantoux test must be carefully preserved and refrigerated according to the manufacturer's instructions. Recent viral infection, immunization with live virus vaccine or corticosteroid treatment may temporarily suppress tuberculin sensitivity. In such cases testing should be delayed by at least 30 days. Persons known to have tuberculosis or strongly positive tuberculin tests should not be retested.

5. The Meaning of a Negative Tuberculin Test. Parents of a routinely tested child who has a negative skin reaction can be reassured that their child shows no evidence of tuberculous infection. They should be instructed to have the child retested if he or she is exposed to an infectious case of tuberculosis, or routinely according to the schedule appropriate for the community.

Children who have been tested because of known exposure should either be treated prophylactically

or, alternatively, retested at three-month intervals until three months after the exposure has ended.

6. Follow-up of a Positive or Doubtful Screening Test. All children with positive or doubtful tests (after retesting with the Mantoux test for doubtful multiple puncture tests) must be medically evaluated by a physician or clinic skilled in the evaluation and management of childhood tuberculosis. Such evaluation should include a careful investigation of possible sources of exposure to tuberculosis, as well as medical history, physical examination, chest x-ray and urinalysis.

Children with doubtful reactions to the Mantoux test may be infected with atypical mycobacteria rather than the tubercle bacillus. If there is frank evidence of such infection, such as cervical adenopathy, appropriate biopsy should lead to definite diagnosis. If there is a history of exposure to tuberculosis or radiographic or clinical evidence of disease compatible with tuberculosis, such children should be treated as if they had positive reactions.

Children with doubtful reactions who have no other evidence of either atypical mycobacterial infection or tuberculosis, should be retested using a different skin site. If the second test is positive, the child should be treated. If it remains doubtful, the child may either be treated prophylactically for tuberculosis or retested after three months, and then at yearly intervals.

All children with positive reactions should receive a prophylactic course of antituberculous medication. Those with clinical or radiologic signs of tuberculosis may require treatment with more than one drug.

Note: Children with positive tuberculin tests or

with primary pulmonary tuberculosis are not a source of infection to other children or adults, and they should not be restricted from school attendance or other activities.

7. Cost of Screening Procedures and Screening Programs. Anyone can learn to administer and read tuberculin tests with three to five hours of training and supervised experience. Only trained persons should interpret skin test results; parents, teachers and other untrained persons may misinterpret either positive or negative reactions.

8. Cost of Screening Test Materials. Test materials cost about 20 to 30 cents per test. Actual testing takes only a few seconds with the multiple puncture test and one or two minutes with the Mantoux test. Reading the test requires approximately one minute. Depending on how tuberculin testing is organized within the EPSDT or school health program, the additional time necessary to obtain parental permission, to record results, to make appointments for test reading or other administrative activities may require one to ten minutes per child tested.

9. Prevention of Tuberculosis in Children. Routine tuberculin testing of all children in most communities is an inefficient and ineffective means of preventing disease because of the low prevalence of tuberculin sensitivity among children -- averaging only one or two per 1000 in reports submitted to the Center for Disease Control. Assuming that tuberculin testing has a specificity of 99 percent, there would be 10 false positive tests for each true positive test if the prevalence were one in 1000, making the cost of detection through screening immense.

In low-prevalence communities children are best protected through early discovery and treatment of any adults with whom they might have contact -- especially parents, other relatives, baby sitters, teachers and other school personnel. Parents should be warned not to leave their children with babysitters, relatives or day-care workers who are not known to be free of tuberculosis. All children and adults who have had close contact with persons known to have tuberculosis should be skin-tested.

References and Additional Reading.

For parents:

You Have Had Your Tuberculin Test, What Will It Show? Pamphlet #1310, American Lung Association*

For teachers:

Tuberculin Tests for Your Pupils. Pamphlet #293, American Lung Association*

For program planners and health professionals:

Edwards, P.Q. and Ogasawara, F.R.: Phasing out the Child-Centered TB Program. Bulletin #97, American Lung Association*

Preventive Treatment of Tuberculosis. American Rev. Resp. Dis., Vol. 104, p.460, 1971*

The Tuberculin Test. Amer. Rev. Resp.Dis.,Vol.104, p.769, 1971*

Current Indications for the Use of Atypical Mycobacterial Test Antigens. Amer. Rev. Resp. Dis., Vol. 102, p. 468, 1970*

* These publications are available from local Christmas Seal Societies or from the American Lung Association, 1740 Broadway, New York, N.Y.

CHAPTER 18. SCREENING FOR BACTERIURIA

1. Purpose and Rationale. The aim of screening for urinary tract infections is to identify individuals who have asymptomatic urinary tract infections. More specifically the aim is to identify persons who have bacterial counts of 100,000 colonies per milliliter of urine on three consecutive cultures.

Through screening for bacteriuria, it is possible to identify the asymptomatic children who are harboring a urinary tract infection which, if not corrected, may result in permanent renal damage. In some children, particularly the very young, such an infection may be associated with congenital urinary tract abnormalities. If the infection is corrected early, the degree of permanent impairment is reduced. In many children, however, urinary tract infections, even when recurrent and accompanied by non-specific symptoms, are not associated with demonstrable congenital abnormalities.

Girls with a history of urinary tract infections frequently have a recurrence during pregnancy. Complications of pregnancy are sometimes associated with urinary tract infections. Therefore, the early identification and prompt treatment of asymptomatic bacteriuria in girls may prevent a recurrence at a later time or at least may alert the physician to a possible recurrence of the urinary tract infection when the girl becomes pregnant.

The prevalence of bacteriuria among newborns has been estimated to be as high as one percent. For preschool children it has been estimated to range between one and two percent. Among first-grade children it is 1.2 percent for girls and 0.04 percent for boys. Thus the prevalence is 30 times greater for girls than for boys. The incidence, or annual conversion rate from noninfected to infected, is approximately 0.4 percent for girls and 0.07 percent for boys.

2. Whom to Screen. It is recommended that only girls be screened on a routine basis since few boys have asymptomatic bacteriuria. Screening is recommended as early in life as the child can provide a specimen upon request. Ideally, this may be achieved as early as one or two years of age, particularly with the use of special collection devices in a comprehensive care setting. When special screening sites are used, however, the earliest practical age is often three to four years.

Retesting on one occasion is advised between the ages of five and seven. The reason for retesting is to find those girls who were not screened earlier. Children who were initially tested between one and four years of age and again at school entry would not require a third test.

3. Method of Screening. The tests of choice are the dip slide tests which utilize a slide or paddle having two culture media. The slide is dipped into the urine specimen, drained of excess urine, and incubated overnight. The amount of growth on the two media (nutrient agar and MacConkeys or EMB) becomes the basis for making an accurate quantitative estimate of the number of colonies and simultaneously ruling out bacterial contaminants. Dip slide products are

commercially available from Bristol Laboratories, Clinical Convenience Products and Smith, Kline and French, as well as from other companies. Ames Laboratories markets a similar product which includes the Griess Nitrite Test, which gives an immediate color reaction in the presence of nitrite. Nitrite is formed when bacteria growing in the bladder reduce dietary nitrate to nitrite. Time to permit incubation is essential. For this reason, the test is most useful when performed with a first morning specimen. Test results for the dip slides are considered to be positive if growth patterns are compatible with counts of 100,000 or more colonies per ml of urine. They are also considered to be positive in the presence of symptoms of a urinary tract infection with colony counts of 50,000 and above.

Any asymptomatic child with a positive culture should be recultured again. Significant bacteriuria is defined as the presence of 100,000 or more colonies per milliliter of the same organism in three consecutive urine cultures. In the presence of symptoms, two consecutive cultures with counts of 50,000 or more per milliliter is sufficient.

Since the manner in which the urine specimen is obtained will influence the count of bacterial colonies, it is important to collect the specimens properly. It is recommended that the mother be instructed in the proper manner of washing the girl with soap and water before collecting the specimen(1).

4. Procedure for Washing Girls. Please follow the instructions carefully in the order that they are given.

a) Remove underpants.
b) Wash your hands, soaping them thoroughly, rinse and shake off excess water.

c) Take one sponge that is wet with washing solution.
d) Spread your child with one hand and with the gauze in the other hand wash well from front to back, dropping the used gauze into the wastepan when finished.
e) Keep your child spread and wash the same way with the second gauze sponge and then with the third and then again with the fourth, discarding each sponge as you finish with it.
f) While still spread, catch some urine in the cup held in a way that will not permit contact with your skin or clothing.

Such washing will decrease the probability of contamination. Some people recommend having the girl bathe the night before the specimen is taken.

The collection of the first specimen in the morning will assure a more concentrated specimen and, therefore, a higher bacterial count if an infection is present. Urine specimens should be kept refrigerated until the culture is taken to avoid the multiplication of contaminants prior to culturing. It is not necessary to use sterile cups, which are considerably more expensive than disposable drinking cups.

5. Follow-up of Positive Results. Children who have significant bacteriuria should receive antibiotic medications and should be recultured.

6. Report to Parent When Screening Findings are Negative. If the child has no history of urinary tract infections and if the screening results are negative, the parent should be told that there is presently no sign of a urinary tract infection but that the child should be rescreened at a future time.

7. Screening Personnel. Most persons can be trained in an hour to collect the urine specimen and to inoculate the dip slide.

8. Time Required to Screen. The time required to prepare the patient and to collect and properly culture the specimen depends on the willingness of the child to void. If the child voids immediately, the time is five minutes. Incubation time after culturing is 18 to 24 hours, so results should be available the day following the test.

9. Cost of Screening Equipment. Dip slides vary in price, depending upon the manufacturer. Generally, they vary between $.60 and $2. Most cost below $1 per test. The price of incubators varies considerably. Generally, they range from $30 to $50. The major cost of the screening program is personnel time.

10. Educational Materials for Parents.

Urinary Tract Infection, Information for the Female Patient. Available without charge from Ames Company, 1127 Myrtle Street, Elkhart, Indiana 46514.

11. Training Materials.

Urinary Tract Infections by Calvin Kunin. A half-hour video tape cassette for physicians. Obtained from Video Digest, Inc., 2030 Carew Tower, Cincinnati, Ohio 45202. Purchase $90. Rental one month $35.

References

1. Kunin, C.M.: Detection, Prevention and Management

of Urinary Tract Infections. Lea & Febiger, Philadelphia, 1972

2. Pryles, C.V.: Laboratory Diagnosis of Urinary Tract Infection. Pediat. Clin. N. Amer. 18:233, 1971

3. Stamey, T.A.: Urinary Infections. Williams & Wilkins Co., Baltimore, Md., 1972

CHAPTER 19. SCREENING FOR ANEMIA

1. Purpose and Rationale. The purposes of screening for anemia are to identify and revise the nutritional practices which can lead to iron-deficiency anemia, to prevent the development of moderate or severe iron-deficiency anemia and to identify children with other forms of chronic anemia so that symptoms and complications may be prevented or reduced.

In the period immediately after birth, two to five percent of children have anemia. Between age nine months and 18 months, 5 to 15 percent of children develop mild or moderate nutritional anemia, and a small proportion of these develop anemia severe enough to cause symptoms or even be a threat to life. During the adolescent growth spurt, 5 to 15 percent of girls and a smaller but significant proportion of boys develop significant nutritional anemia. In addition, a small proportion, 0.1 to 0.3 percent, of children, have chronic anemia due to genetic or acquired abnormalities in production or destruction of red blood cells.

If identified and treated early, iron-deficiency anemia will not progress to cause symptoms or danger to life. There is suggestive, but inconclusive, evidence that even mild iron deficiency can reduce resistance to infections, reduce a child's attentiveness and ability to learn, or in adolescent girls, increase the risk of abnormality in pregnancy.

Iron deficiency is easily and inexpensively treatable, and once treated, its recurrence can be prevented by relatively simple and inexpensive dietary changes.

Early identification of the non-nutritional anemias of childhood can lead to medical supervision that may prevent or reduce symptoms and complications. Most of these anemias result from genetic disorders and cannot be "cured" but require continuing medical supervision.

The dietary practices which lead to iron-deficiency anemia often lead to other nutritional problems and so identification of iron-deficiency anemia can also lead to dietary counselling that will improve the general nutrition of the child.

2. Identifying Children To Be Screened. All children should be screened in the first few days of life, most practically at the same time that blood is obtained for the routine P.K.U. test. Children who have not been screened at birth should be screened at the first opportunity during the first year of life.*

All children should again be screened at approximately 12 to 15 months of age, and again at 11 to 14 years, preferably after the peak of the adolescent growth spurt. Those who have not been screened at age 12 to 14 months should be screened at the first opportunity through age six. Between age seven and

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* Low birth weight infants are especially susceptible to develop iron-deficiency anemia during the first year of life and should be screened at 5 to 7 months as well as at birth and at 12 to 14 months.

adolescence, iron-deficiency anemia is uncommon, and most other anemias will already have been discovered from symptoms, so routine screening is not considered necessary. A child who has a normal test at age 12 to 15 months will rarely develop anemia before adolescence. Retesting is not therefore necessary during early childhood.

3. Methods for Use in Screening. There are two currently acceptable methods of screening for anemia: the microhematocrit and the determination of hemoglobin concentration.

a) The microhematocrit method is simple, accurate and inexpensive. Blood obtained from a finger or heel prick is sealed into a capillary tube and centrifuged in a special centrifuge for five to 10 minutes. The centrifuged capillary tube is then placed on a reading device which indicates the volume of packed red blood cells as a percentage of the total blood volume. The packed cell volume is referred to as the hematocrit. Normal values are shown in the following table.

Age	Hematocrit Value (%)	Hemoglobin Value gm/100 ml.
2 - 5 days	45 or higher	15 or higher
2 months - 2 years	33 or higher	11 or higher
2 years - 10 years	36 or higher	12 or higher
Over age 10	38 or higher	13 or higher

The microhematocrit can be performed by anyone after a minimum amount of training, and the equipment is relatively inexpensive and requires no calibration and little maintenance. It can thus be used in any physician's

office or small clinic.

b) Accurate hemoglobin determinations require more care, skill and special equipment than do microhematocrit determinations. Blood from a finger or heel prick must carefully be measured in an accurate pipette, and then mixed with a carefully measured amount of dilutant. The optical density of this solution is measured in a photocolorinator, giving a value of hemoglobin concentration in grams of hemoglobin per 100 ml whole blood. Special disposable devices combining an "automatic" pipette with a premeasured amount of dilutant make it possible for briefly trained persons to perform the accurate measurement and dilution that is necessary.

In obtaining finger prick or heel prick blood, inaccurate results may occur unless the skin has been dried after cleaning, the dry finger or heel is warm, and a free flow of blood occurs without the necessity of squeezing or "milking."

For both hemoglobin and hematocrit determinations, blood samples can be obtained at remote screening sites and forwarded to a central laboratory for processing.

Both methods can be used together, in which case each serves as a check on the accuracy of the other, and the two together provide information which is useful for diagnosing and treating the child with an abnormal test. Many hospitals, large clinics and commercial laboratories now have very expensive and sophisticated electronic counters that almost instantaneously determine hemoglobin, hematocrit and red blood cell count, and in addition calculate red cell indices, usually at a cost no greater than a

single hemoglobin or hematocrit determination. The additional information provided by such equipment can be of great help in further diagnosing any anemia discovered.

If determination of erythrocyte protoporphyrin is being used for screening for lead poisoning, it can simultaneously provide information that identifies iron deficiency and anemia.

A brief dietary history will reveal the cause of many instances of iron deficiency between age six months and 18 months. A child who is ingesting more than a quart of milk a day at this age is much more likely to develop iron deficiency and other nutritional disturbances than one who is ingesting less than a quart, and those who drink fresh milk are much more likely to develop anemia than those who drink reconstituted evaporated milk or commercially prepared infant formulas. Infants of this age who are drinking large amounts of fresh milk should have their diet modified whether or not they have a positive screening test for anemia.

4. The Meaning of a Negative Screening Test. A child with a normal test at any age probably has adequate iron stores to prevent iron-deficiency anemia, at least until the next period of rapid growth, assuming the diet is grossly normal. A child with a negative screening test at 12 to 15 months does not have any of the severe genetic forms of chronic anemia.

Parents of children who are screened as normal at birth should be encouraged to feed a diet that will maintain adequate iron nutrition throughout the first year of life. Parents of children screened as normal at age 12 to 15 months should be encouraged to continue their apparently adequate dietary practices. Children who have normal tests just after

the adolescent growth spurt can be reassured that their dietary habits are probably nutritionally adequate.

5. Follow-up of a Positive or Equivocal Screening Test. If the screening test has consisted of a single hemoglobin or hematocrit determination, it should be repeated for confirmation. If the screening has included both hemoglobin and hematocrit determination, or duplicate determinations of either, such confirmation may not be necessary.

All infants under six months of age with positive screening tests should receive competent pediatric evaluation to determine the cause of the anemia and to institute appropriate treatment, counselling and follow-up.

Children older than age six months who have positive screening tests should have their dietary and growth histories reviewed. Children who are growing rapidly, who have no regular iron supplementation and who consume large quantities of fresh milk are most likely to develop iron deficiency. If one or more of these factors is present and if the anemia is not severe (hemoglobin higher than 9 gm/100 ml or hematocrit higher than 27 percent) such children may be given appropriate treatment for iron deficiency as a therapeutic trial. Such treatment includes:

- medicinal iron, 2 mg/kg three times daily for three months
- use of reconstituted evaporated milk (or commercially packaged infant formula) rather than fresh milk
- reduction in total milk intake to approximately 16 ounces a day and recommendation of other foods, especially those which naturally contain iron.

A child who has participated in such a therapeutic trial should be rechecked in four to six weeks. If anemia is no longer present, no further evaluation is necessary (though such children should have their dietary history checked at future health care visits and might be rescreened after eight to 12 months to be sure that adequate hemoglobin or hematocrit values are maintained.)

A child whose anemia is not cured by the therapeutic trial, or any child with more severe anemia or a history that is not suggestive of iron deficiency, should have a general medical evaluation and appropriate laboratory tests performed to establish the cause of the anemia.

Older children and adolescents with confirmed positive screening tests can be managed in a similar way, with medicinal iron therapy used as a therapeutic test for iron deficiency. Changes in the amount or type of milk consumed are probably not important at this age.

6. Costs of Screening Procedures and Screening Programs. Blood samples can be obtained by persons with only a few hours of training and preliminary in-service supervision -- volunteers, aides, technicians, nurses or physicians. The time involved for the parent and child and the person obtaining the sample is only two to five minutes.

The microhematocrit equipment costs approximately $300 for centrifuge and reader. The cost of supplies for each hematocrit test is only three to five cents. Any person can perform the test with a time expenditure per test of two to five minutes after minimal training. (There is a delay while the centrifuge is spinning and so the "turn around" time for results may be eight to ten minutes.)

Hemoglobin determinations require equipment which costs at least several hundred dollars and which must be carefully maintained and calibrated with known standards. Automated electronic equipment costs many thousands of dollars but can be used with great efficiency. When such equipment is already in place for other purposes, it should be possible to contract for screening determinations for less than one dollar per test.

The average cost of medical treatment and follow-up of children with abnormal screening tests will probably not exceed $40 per child, though the cost of those children with anemia other than iron deficiency will be much higher. Careful inquiry and counselling about diet in the first year of life can probably prevent all instances of iron-deficiency anemia in early childhood. Screening programs which include such preventive care could eliminate all costs of treatment and follow-up of iron deficiency.

Further Reading.

Dietary advice for parents and children:

U.S. Children's Bureau. Infant Care. U.S.Govt. Printing Office, Washington, 1973

What to Feed Your Family*

Food before Six*

A Boy and His Physique*

A Girl and Her Figure*

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* Pamphlets available without charge from National Dairy Council, Chicago, Illinois 60606

For planners and professionals:

Woodruff, C.W., Wright, S.W. and Wright, R.D.:
The Role of Fresh Cow's Milk in Iron Deficiency.
Amer. J.Dis. Child. 124:18-23, 26-30, 1972

CHAPTER 20. SCREENING FOR SICKLE CELL DISEASE AND FOR SICKLE CELL TRAIT

1. Purpose and Rationale. The purpose of screening for the sickle cell diseases (the major hematological diseases associated with the presence of hemoglobin S) is to prevent the severe and life-threatening complications which may arise in persons with these conditions. The purpose of screening for the genetic traits which enable a person to produce offspring who may be afflicted with one of the sickle cell diseases is to offer parents and prospective parents information and understanding which they may need to make informed decisions about reproduction.

Approximately one of each four hundred Afro-American babies is afflicted with one of the sickle cell diseases. A substantial number of these infants may die in the first two years of life. Many of these deaths and much of the pain and disability that is common in afflicted children can be prevented by careful comprehensive medical care which recognizes the special susceptibility of these children to ill effects from certain infections and from common childhood illnesses involving vomiting and diarrhea.

Approximately eight percent of American Blacks (and a smaller proportion of other ethnic groups) have genetic traits which enable them to produce offspring with one of the sickle cell diseases. When a prospective father and mother each has such a genetic trait, each of their offspring has a one-in-four chance of

having one of the diseases. Prospective parents may wish to know of this risk to prepare themselves for the care of an affected child, or to reduce their chances of producing a child with disease by taking any of the steps described.

2. Identifying Persons Who Should Be Screened.

a) For the sickle cell diseases.

In the United States, hemoglobin S is found in eight to 10 percent of Blacks and in a much smaller proportion of persons of Greek and Italian ancestry and of Latin Americans from coastal areas of the Caribbean and South America. European whites, Orientals and other Central and South Americans rarely have hemoglobin S. Hemoglobin C, which may interact with hemoglobin S to produce disease, is also most commonly found in Blacks. Thus, if all infants born to parents of the commonly affected ethnic groups are screened, few if any children with sickle cell diseases will be overlooked. Screening for disease should be performed in the first days or weeks of life if it is to be effective in helping to prevent problems in the first year of life. After age one, nearly all children with a sickle cell disease will already have signs and symptoms of the disease and will have anemia. After age one, screening for sickle cell disease can be confined to anemic children who do not respond to iron treatment (see Chapter 5).

b) For sickle cell trait

The question of who should be screened for the genetic traits is much more complex.

When a genetic trait is found, the only thing that can be done is to give advice regarding marriage and reproduction, a most sensitive, private and poorly understood area of human behavior. For a person with sickle cell trait, the reproductive choices available at the present time are limited to:

- avoiding marriage to persons with the trait
- avoiding all pregnancies through birth control if both partners have the trait
- terminating early any unplanned pregnancy through legal abortion if both partners have the trait
- initiating pregnancy through artificial insemination
- running a 25 percent risk of producing a child affected by a sickle cell disease if both partners have the trait.

There are no data as yet on the degree to which the various alternatives are acceptable, or whether counselling based on screening has any affect on the choices which people make.

There is a very high risk that persons who are informed that they have a genetic trait may misinterpret the information in ways that greatly upset their lives -- by worrying unnecessarily, by placing unnecessary restrictions on their activities (or those of their children) or by attributing symptoms of other illness to the presence of the trait and thus delaying or avoiding appropriate medical care. Because of the uncertain benefits and the real dangers of informing

a person that he has sickle cell trait, there are certain widely accepted limitations on who should be screened:

1. Only persons who voluntarily seek the information should be screened.

2. All persons screened should have been given the opportunity to learn the reproductive alternatives available to persons with the genetic trait.

3. All persons screened should have been given the opportunity to learn that having the trait should not affect their life activities and health care.

Thus, screening programs for sickle cell trait should be aimed at persons older than age 13 or 14 who have been exposed to an educational program which accurately describes the consequences of sickle cell trait and sickle cell disease. Any person screened should be given the opportunity to obtain individual counselling regarding the meaning and implications of his or her positive or negative test.

3. Frequency of Screening. Once a suitable test for sickle cell disease or for the genetic trait has been performed, it need never be repeated. However, if the accuracy of a test given in the past is questionable, a repeat test with a more accurate method is justified.

4. Methods for Use in Testing for Sickle Cell Disease or Trait. The only screening method which accurately identifies the sickle cell diseases in the first months of life is acid agar gell hemoglobin

electrophoresis.*

In screening for the genetic trait a hemoglobin electrophoresis method is greatly preferable to any test which depends on the sickling phenomenon or on the differential solubility of hemoglobin S. Approximately two percent of Black Americans have hemoglobin C trait, which is not identified by the latter two methods. If a person with hemoglobin C trait reproduces with a person with hemoglobin S trait, their offspring may have a disease which is very similar to sickle cell disease. If hemoglobin C is not discovered in the screening, many couples who have been counselled that reproduction is without hazard will produce children with a serious sickle cell disease. Such persons would rightly object that they had been given bad advice. The electrophoretic methods will identify both traits, so that much more suitable counselling can be given.**

Materials and laboratory equipment for electrophoretic screening are readily available at relatively low cost, and the methods are not technically difficult. The laboratory determinations and procedures should be performed under the general supervision of a hematologist or clinical pathologist who is capable of maintaining quality control and of

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* Chromatography, which is also capable of identifying sickle cell diseases, has not yet been developed as a practical screening test.

** Approximately one-half to one percent of Black Americans have the beta-thalassemia trait, which when inherited in combination with sickle cell trait, causes a sickle cell disease. Screening for this trait requires an entirely different method.

interpreting unusual findings, such as rare hemoglobin types. Blood samples may be obtained in remote screening sites and forwarded to a central laboratory for processing using simple microhematocrit tubes. No special precautions are necessary for preservation of the sample. The electrophoretic techniques are extremely reliable and accurate, and so there should be almost no problem with false positive or false negative test results.

When special programs have been mounted to screen for sickle cell trait, it has been desirable to have test results available within 20 to 30 minutes so that counselling and reassurance can be given without a special follow-up visit. When sickle cell screening is part of a more general health screening and care program, such immediate availability of results is less important.

5. The Meaning of a Negative Screening Test. Newborn infants with a negative agar gell electrophoretic test for sickle cell disease have no chance of developing one of these diseases, and parents can be assured of this. Persons who have a normal hemoglobin electrophoresis can be reassured that their offspring will not be affected by a sickle cell disease.* If a screening test depending on the sickling phenomenon or on red cell solubility has been performed, no assurance can be given as to the normality of any offspring.

6. Follow-up of a Positive Screening Test. A newborn infant who has been found to have a sickle cell disease must be offered careful continuing pediatric

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* except for rare instances of disease due to thalassemia.

health supervision. The nature of the disease must be explained to the parents, and they must be given instructions to seek expert medical care immediately at the first sign of fever, of weakness or pallor, or of conditions which might lead to dehydration. The major threats to life in such children are overwhelming bacterial sepsis and anemic shock due to sequestration of red blood cells in the spleen. They must be treated with penicillin and carefully observed during suspected infections. They must be tested for anemia when pale or weak, and treated for shock if necessary. Meticulous attention to fluid balance during illnesses with vomiting or diarrhea may prevent many of the painful vaso-occlusive "crises" which otherwise may accompany dehydration. Any program screening for sickle cell disease in infancy must do everything possible to ensure that every child with a sickle cell disease receives such care. Unless such care is available, screening of newborns should not be undertaken.

Adolescents or adults who are found to have sickle cell trait or hemoglobin C trait must be given two kinds of counselling. First, they must be strongly and convincingly assured that they do not have any kind of a disease. The life expectancy of people with the genetic traits is the same as that of other people. While a few people with sickle cell trait suffer ill effects when exposed to conditions in which there is a severe lack of oxygen (high altitudes), there is little proof that these ill effects are actually due to the sickle cell trait or are more common in persons with sickle cell trait than in other persons. The only restrictions that might be recommended for those with sickle cell trait is that they not become test pilots or Alpine climbers. Second, the chances of their producing an offspring with sickle cell disease and the conditions under which they might produce such an offspring must be explained. There must be an explanation of the chances that such an offspring has to lead a normal or abnormal life. The

various ways by which a person with the trait can avoid producing such offspring must also be carefully explained so that the individual can intelligently choose what course he or she will take. Honest printed information should be given to all those counselled, and they should be given clear opportunities to return for further counselling if they desire it.

7. Costs of Screening Procedures and Screening Programs. Only persons with special training and supervision should perform the actual electrophoretic tests. The total cost of equipment, supplies and labor should be no more than one to three dollars per test.

When testing is done as a part of routine health supervision, the necessary counselling can be done by physicians or nurses who are already aware of the knowledge and attitudes of the person with the genetic trait. When screening is separate from general health care, education of the person before testing and counselling about both positive and negative results following tests must be an integral part of the screening program. Whether performed by physicians, nurses or others, such education and counselling can be provided only by people who have had careful training both in the meaning of sickle cell diseases and trait and in skills for interviewing and counselling. Such persons should have access to expert hematological and genetic consultation and should utilize such consultation freely. There is a great potential for persons screened for sickle cell trait to develop unhealthy attitudes and misinformation. No screening for sickle cell trait should be undertaken until all those providing pre-test or post-test counselling have been thoroughly trained.

8. Educational Materials.

Sickle Cell Anemia and Sickle Cell Trait. Brochure

available from: Chief, Health Staff, Job Corps, Manpower Administration, Dept. of Labor, Washington, D.C.

Sickle Cell Anemia and Sickle Cell Trait. Color, sound, 33-minute, 16 mm motion picture film available on loan without charge from Modern Talking Pictures, 1212 Avenue of the Americas, New York, N.Y. 10036

9. Training Materials.

Guidelines for Counselling Young Adults with Sickle Cell Trait. Available from Job Corps, Manpower Administration, Dept. of Labor, Washington, D.C.

Further Reading.

Beutler, E. et al: Hazards of Indiscriminate Screening for Sickling. New England Journal of Medicine, Vol. 285, p. 1485, 1971

Fost, N. and Kaback, M.M.: Why Do Sickle Cell Screening in Children? Pediatrics, Vol. 51, No. 4, pp. 742-744, April 1973

Pearson, H.A. and O'Brien, R. T.: Sickle Cell Testing Programs. J. Pediatrics 81:1201, 1972

Whitten, C.A. (editorial): Sickle Cell Programming - An Imperiled Promise. New Eng.J.Med. 288:318-319, 1973

CHAPTER 21. SCREENING FOR INCREASED LEAD ABSORPTION

1. Purpose and Rationale. The purpose of screening for increased lead absorption is to prevent death and disability from lead poisoning. This can be accomplished by identifying children who have absorbed an undue amount of lead from their environment, reducing their exposure to lead and medically removing already absorbed lead from certain children who have ill effects or are in danger of developing ill effects.

It is estimated that more than one hundred children die each year from lead poisoning and several hundred more have permanent brain injury following recovery from symptomatic lead poisoning. It is likely, but not certain, that thousands of other children may suffer various degrees of brain damage from lead poisoning which never produces obvious symptoms and thus is unnoticed or unreported.* Once acute symptoms have developed, presently available treatment is not fully effective in preventing death or brain damage.

The major cause of symptomatic lead poisoning in children is repeated ingestion over several weeks or months of paint chips or putty chips containing lead pigment from old and deteriorating homes. Such

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* The prevalence of renal and peripheral nerve damage from lead poisoning in children is unknown, but such damage has been reported in adults.

ingestion occurs almost exclusively in children between ages one and six years who live in, visit or obtain day care in buildings which contain loose or peeling lead-pigment paint. At least ten percent of children between ages one and six live in such circumstances. Surveys of such children indicate that from 15 percent to more than 50 percent, depending on the community, have absorbed sufficient lead to produce blood lead levels well above those found in non-exposed children. In some children dust, dirt and automobile exhaust fumes account for a part of this increased absorption. Exposure to these sources alone rarely if ever causes symptomatic lead poisoning, but it may reduce the amount of ingestion of paint necessary to cause symptoms. If children with undue absorption can be identified through screening and separated from the source of lead, both symptomatic and silent lead poisoning can be prevented.

2. Identifying Children To Be Screened. All children between ages one and six who live in poorly maintained buildings built before 1950, who visit relatives, friends or babysitters in such buildings or who obtain day care in such buildings should be screened, unless careful epidemiologic surveys have shown that lead poisoning is not a problem in the community. Any child known to be exposed to other sources of lead, such as industrial lead fumes, should also be screened. Children with unexplained gastrointestinal symptoms, central nervous system symptoms or anemia should also be tested for undue lead absorption, but such testing is considered a part of the diagnosis of these conditions, not part of screening as such.

3. Frequency of Screening in Susceptible Children. Children at risk should be screened at least yearly

beginning at their first birthday or during the months of May, June and July following their first birthday. (Blood lead levels are higher and evidence of intoxication more frequent in the summer months.) If possible, children should be screened two or three times a year (perhaps in March, June and August) until age three. One to three is the most susceptible age period, and it is possible for a child in this age group who has had a normal screening test to develop irreversible damage from lead poisoning in less than one year.

Children who have negative screening tests throughout the second and third years of life probably do not live in an environment which permits excessive exposure to lead. Similarly, four- and five-year-olds who are normal at first testing probably have avoided the risk of lead ingestion. Retesting of these children, unless their environment is changed, is much less important than testing younger children at risk. Children with normal or slightly elevated lead levels who are no longer exposed to lead hazards (because of a move to newer housing, for example) need not be retested.

4. Methods for Use in Screening for Undue Lead Absorption.

a) Blood lead determinations

Currently the most widely accepted method of screening for undue lead absorption is the blood lead determination* using

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* Other methods, including urine lead levels, urine coproporphyrins and urine delta amino levulinic acid (ALA), have been proven to be inadequately sensitive.

atomic absorption spectrophotometry, anodic stripping voltammetry or the dithizone method.

All these methods require meticulous attention to the method of obtaining the blood sample, complex special laboratory equipment costing many thousands of dollars, highly skilled laboratory technicians, and continuing expert supervision of laboratory methodology. These can best be achieved by having all blood samples tested in a few centralized well-supervised laboratories.

The particular laboratory method chosen is much less important than the skill, training and supervision of those who perform the laboratory determination. Planning for blood lead testing in EPSDT programs should be carefully coordinated with testing already taking place in the community, region or state so that a minimal number of laboratories can serve all programs.

Dust and dirt on the skin of children can contain sufficient lead to contaminate the blood sample, producing laboratory values which greatly overstate the blood lead levels. Similarly, needles, syringes, glassware, cotton swabs and disinfectants used to obtain or to transport blood samples can contain sufficient lead to give falsely high readings. For this reason, blood samples must be obtained by persons trained and supervised in careful cleansing of the skin site from which blood will be obtained. All disinfectants, needles, syringes and glassware used in obtaining samples must be certified as lead-free by the laboratory responsible for blood testing.

Because of the risk of contamination during sample collection and limitation in the precision of laboratory measurements of lead, duplicate deter-

minations should be performed on each blood sample tested. When capillary blood is used, two tubes should be submitted and tested. Even with good quality control, the precision of the laboratory test is about ±5 micrograms of lead. Thus a laboratory report of 40 micrograms indicates a "true" level between 35 and 45 micrograms. Two successive determinations with values of 40 and 48 may represent laboratory variation rather than any change in the status of the child. All persons who interpret blood lead level reports must keep this imprecision in mind, or they may make faulty conclusions.

Any child with a blood lead level over 40 micrograms/100 ml should have a confirmatory blood lead determination. Children with a blood level of over 50 micrograms/100 ml should be evaluated at the time the second blood sample is obtained for the presence of any symptoms and for evidence of metabolic effects of lead toxicity.

b) Free erythrocyte protoporphyrin tests (FEP).

Because of their recent introduction, tests for blood protoporphyrin have been less widely used and accepted than have blood lead tests. However, as a screening test, the FEP test has several potential advantages over blood lead determinations. The test is simple and rapid and is unaffected by lead contamination of the skin or glassware. It can be performed in most hospital laboratories, or even with portable equipment. Results can be reported within less than an hour so that follow-up can begin immediately. The duplicate or triplicate determinations necessary to achieve

accuracy in blood lead determinations are not necessary for FEP determinations. The FEP has been found to identify correctly all children with blood lead levels over 50 micrograms/100 ml, the children who may need immediate treatment. Its low cost makes frequent repeated testing of high-risk children more feasible.

The disadvantage of the FEP test is that a proportion of children with blood lead levels between 40 and 60 micrograms/100 ml, who may have undue absorption of lead and thus need protection against further ingestion, will have normal FEP values. (The proportion will vary with the FEP level chosen as the cut-off point between normal and abnormal values.)

Also children with iron deficiency have elevated FEP levels, and in some communities a high proportion of children with positive FEP tests will have iron deficiency anemia rather than elevated blood lead.

Whichever test is chosen for initial screening, laboratory facilities for blood lead determination must be present to evaluate and manage children with positive screening tests. Similarly, it is highly desirable to have the capability of performing the FEP test, since it is an excellent measurement of the toxic metabolic effects of lead.

In communities or regions in which laboratory facilities for blood lead testing are adequate, the blood lead determination may be the best current choice for screening. In communities in which blood lead testing facilities are currently inadequate, use of the FEP test can permit

immediate screening of a large number of susceptible children, and the limited blood lead testing capacity can be used for confirmation, treatment and follow-up. If current research should indicate that children screened as normal by the FEP method are truly of very low risk, all screening programs could substantially reduce their costs by using this method.

If the FEP test is used as the first screening test, all children with a positive screening test (level for positive to be determined by testing lab) should have an immediate blood lead determination and should be evaluated and treated, if necessary, for iron deficiency. When this blood lead determination is above 40 micrograms/100 ml, the child should be evaluated and managed in the same way as a child who has had two blood lead levels over 40 micrograms/100 ml. When the blood lead level is below 40, repeat screening should be scheduled at the appropriate interval.

5. The Meaning of a Negative Screening Test. A child with a blood lead level under 40 micrograms/100 ml on initial or confirmatory testing, or a child with a negative FEP test, probably has not yet absorbed enough lead to be at immediate risk of developing clinical lead poisoning. He or she should be retested at periodic intervals according to age and residence (see Section 3). The child's parents should be made aware of the sources of lead in the environment and of steps they can take to prevent undue exposure.

6. Follow-up of a Positive Screening Test. Any child with repeated blood lead levels over 40

micrograms/100 ml or who has symptoms or metabolic tests suggesting lead intoxication should immediately be evaluated by a physician or clinic specially equipped to evaluate and treat lead poisoning. Such a physician must be well versed in the symptoms and signs of lead intoxication, must have access to reliable laboratory facilities and must have effective working relationships with organizations capable of investigating homes for lead intoxication hazards as well as with authorities empowered to enforce housing codes. Children with blood lead levels between 40 and 50 micrograms can often be well-managed by their own physicians or clinics using protocols developed in conjunction with the lead poisoning specialists.

The precise nature of this evaluation and the criteria for removing children from their homes and for treating them with chelating agents are not currently standardized and are subject to rapid change with the development of new knowledge and technology.

At a minimum, all children with confirmed positive tests should:

- be evaluated for clinical signs or symptoms of lead intoxication
- be tested for metabolic evidence of lead intoxication
- have their environment investigated for possible sources of lead exposure
- be separated from any potential sources of further lead exposure
- be tested repeatedly to ensure that separation from sources of lead is effective.

Current methods for such evaluation, testing and prevention are described in the reference materials listed at the end of this chapter.

It may be necessary for a screening program to survey all physicians, hospitals and clinics in its region to identify those with the necessary interests and capabilities so that referrals can be effective.

7. Costs of Screening Procedures and Screening Programs. Finger prick blood samples can be obtained by volunteers, aides, technicians, nurses or physicians. Non-professional workers need only a few hours of training. Such persons can collect 10 to 15 samples per hour.

Blood samples, properly preserved and sealed, can be mailed or transported to a central laboratory at little cost.

The cost of the laboratory determination of blood lead depends almost entirely on how efficiently expensive equipment and technicians are used. In laboratories processing as many as 50,000 samples per year, the total cost can be less than one dollar per determination, including equipment, supplies, personnel and clerical costs. With much lower volumes the cost can be as high as $5 to $10 or more per determination. Regional or statewide planning of laboratory facilities is clearly desirable.

The cost of medical follow-up and management of all children with an initial abnormal screening test will probably not exceed $200 per child, though the cost for some children, especially those who require hospital treatment, will be much more. Because screening must be repeated several times for

children at risk, because a large proportion of children tested are likely to require either re-testing or complete evaluation, and because each test and evaluation is relatively expensive, all screening programs must constantly re-evaluate all aspects of their operation that can affect costs. Otherwise, the costs can rapidly exceed the amount spent on all other aspects of child health care. The following questions must be asked:

- Is blood testing confined to children who actually live in environments which place them at risk?

- Are blood samples obtained and tested with methods that ensure the lowest possible number of false positive and false negative tests?

- Are the following elements as economical as is consistent with prevention of damage to the children?

  a) the criteria used for positive tests

  b) the methods and criteria for evaluation of children with positive tests

  c) the criteria for hospitalization and for chelation therapy.

Any unnecessary evaluation or treatment is costly not only in money, but also in pain, inconvenience, anxiety and possible side effects for the child and the parents.

The greatest cost in the total program is the rehabilitation of the housing in which the children live. This cost is usually not borne by the screening program, but unless children are effectively

separated from their sources of lead, the other costs of the screening and treatment programs will be almost entirely wasted. A child with increased lead absorption or lead poisoning who returns to an unmodified home will almost certainly be poisoned again, and the risk of permanent damage increases with each episode. Much can be accomplished by the family itself by frequent cleaning of floors, window sills and other surfaces where dust collects, and by covering hazardous painted surfaces with wallboard or heavy contact paper.

Further Reading

For parents and lay groups:

Parents: Are Your Walls Poisoning Your Children? U. S. Department of Health, Education and Welfare, publication No. (HSM) 73-10009

Watch out for Lead Paint Poisoning. (Also available in Spanish) U. S. Public Health Service publication No. 2147 (English) and DHEW publication No. (HSM) 72-5106 (Spanish)

For health professional personnel and program planners:

Lin Fu, J.:Undue Absorption of Lead among Children - A New Look at an Old Problem. New Eng. J. Med. 286:702-710, 1972 (Reprints available from Dr. Lin Fu, Room 12-E 08 Parklawn Building, 5600 Fishers Lane, Rockville, Maryland 20852)

Medical Aspects of Childhood Lead Poisoning. Pediatrics 48:464, 1971

Chisolm, J. J.: Screening Techniques for Undue Lead Exposure in Children: Biological and Practical Considerations. Journal of Pediatrics 79:719-725, 1971

APPENDIX

Other Examples and Sources of Interview and Physical Examination Forms and Schedules:

Standards of Child Health Care. American Academy of Pediatrics, 1801 Hinman Avenue, Evanston, Illinois 60204

Health Supervision of Young Children. American Public Health Association, 1015 18th St., N.W., Washington, D.C. 20036

Day Care: Health Services. Office of Child Development. U. S. Department of Health, Education and Welfare, P. O. Box 1182, Washington, D.C.20013 (DHEW Publication No. OCD 72-4)

Wilson, C.C., School Health Services, National Education Association, 1201 16th St., N.W., Washington, D.C. 20036

Permanente Pediatric Multiphasic Medical History Questionnaire. Permanente Medical Group, 280 W. MacArthur Blvd., Oakland, California 94611.

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PERMANENTE PEDIATRIC MULTIPHASIC MEDICAL HISTORY QUESTIONNAIRE

THIS FORM IS TO HELP YOUR DOCTOR GIVE YOU BETTER HEALTH CARE. IT IS COMPLETELY CONFIDENTIAL AND WILL BE PART OF THE MEDICAL RECORD. PLEASE COMPLETE THIS FORM AS BEST YOU CAN. IF YOU HAVE DOUBTS ABOUT ANY OF THE QUESTIONS, LEAVE THEM BLANK AND WE WILL ASSIST YOU ON THE DAY OF YOUR APPOINTMENT.

DATE

NAME

BIRTHDATE

MR. NUMBER

FOR YOUR CHILD TO HAVE A PEDIATRIC MULTIPHASIC, A PARENT OR LEGAL GUARDIAN MUST COMPLETE AND SIGN THIS FORM. BE SURE TO BRING IT WITH YOU AT THE TIME OF YOUR APPOINTMENT.

CHILD'S NAME _____

I GIVE PERMISSION FOR MY CHILD TO HAVE THE TESTS INCLUDED IN THE PEDIATRIC MULTIPHASIC EXAMINATION.

(CHECK ONE) Mother ☐ Father ☐ Legal Guardian ☐ Adoptive Parent ☐

Signature _____

Date _____

YOUR CHILD'S HEALTH

☐☐☐☐☐ M. D. I.D. #

IDENTIFYING DATA

CHILD'S ADDRESS _____

PHONE NUMBER _____ SEX OF CHILD MALE ☐ FEMALE ☐

FAMILY HISTORY

1. HOW MANY CHILDREN DO YOU HAVE? (Circle one)

1 2 3 4 5 6 7 8 9 or more

2. WAS THIS CHILD YOUR? (Check one)

FIRST ☐ SECOND ☐
THIRD ☐ FOURTH OR LATER ☐

3. HAS CHILD'S MOTHER HAD ANY MISCARRIAGES?

YES ☐ NO ☐

4. IS THE CHILD ADOPTED? YES ☐ NO ☐

5. LIST NAME, AGE AND SEX OF BROTHERS AND SISTERS INDICATE IF FULL BROTHER OR SISTER

	Full YES	Full NO
1. NAME _____ AGE ___ SEX ___	☐	☐
2. NAME _____ AGE ___ SEX ___	☐	☐
3. NAME _____ AGE ___ SEX ___	☐	☐
4. NAME _____ AGE ___ SEX ___	☐	☐
5. NAME _____ AGE ___ SEX ___	☐	☐
6. NAME _____ AGE ___ SEX ___	☐	☐

6. HOW TALL IS CHILD'S MOTHER? _____ FEET ___ INCHES

7. HOW TALL IS CHILD'S FATHER? _____ FEET ___ INCHES

8. HOW MANY PEOPLE LIVE AT HOME? (Circle one)

1 2 3 4 5 6 7 or more

9. PLEASE CHECK IF ANY OF CHILD'S BLOOD RELATIVES EVER HAD ANY OF THESE CONDITIONS

	Father	Mother	Father's Side	Mother's Side	Brothers	Sisters
MENTAL RETARDATION	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 8
SEVERE ANEMIA	☐ 9	☐ 10	☐ 11	☐ 12	☐ 13	☐ 14
ASTHMA, HAY FEVER	☐ 15	☐ 16	☐ 17	☐ 18	☐ 19	☐ 20
BLEEDING TENDENCY	☐ 21	☐ 22	☐ 23	☐ 24	☐ 25	☐ 26
MENTAL ILLNESS	☐ 27	☐ 28	☐ 29	☐ 30	☐ 31	☐ 32
TUBERCULOSIS	☐ 33	☐ 34	☐ 35	☐ 36	☐ 37	☐ 38
UNUSUALLY SHORT SIZE	☐ 39	☐ 40	☐ 41	☐ 42	☐ 43	☐ 44
KIDNEY PROBLEM	☐ 45	☐ 46	☐ 47	☐ 48	☐ 49	☐ 50
BEEN EXTREMELY FAT	☐ 51	☐ 52	☐ 53	☐ 54	☐ 55	☐ 56
INHERITED OR FAMILY DISEASE	☐ 57	☐ 58	☐ 59	☐ 60	☐ 61	☐ 62
DIABETES	☐ 63	☐ 64	☐ 65	☐ 66	☐ 67	☐ 68
CONVULSIONS OR EPILEPSY	☐ 69	☐ 70	☐ 71	☐ 72	☐ 73	☐ 74
BIRTH DEFORMITY	☐ 75	☐ 76	☐ 77	☐ 78	☐ 79	☐ 80

WRITE IN ANY CONDITIONS NOT LISTED ABOVE THAT RUN IN YOUR FAMILY: _____

10. AT THE PRESENT TIME, WHO USUALLY CARES FOR YOUR CHILD DURING THE DAY OR AFTER SCHOOL? (Check one)

CHILD'S MOTHER ☐ CHILD'S FATHER ☐
SOME OTHER FAMILY MEMBER ☐ FRIEND ☐
BABY-SITTER ☐

11. DOES YOUR FAMILY SPEAK A SECOND LANGUAGE AT HOME?

YES ☐ NO ☐

12. IS YOUR CHILD GENERALLY IN GOOD HEALTH?

YES ☐ NO ☐

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PERINATAL HISTORY OF CHILD'S MOTHER

1. DID YOU HAVE ANY OF THESE ILLNESSES DURING YOUR PREGNANCY WITH THIS CHILD?

	YES	NO
MEASLES DURING FIRST 3 MONTHS	☐	☐
OTHER INFECTIONS	☐	☐
IF YES, WHAT? _____		
BLEEDING DURING FIRST 3 MONTHS	☐	☐
BLEEDING DURING LAST 3 MONTHS	☐	☐
SEVERE VOMITING OR NAUSEA	☐	☐
HIGH BLOOD PRESSURE	☐	☐
ALBUMIN OR PROTEIN IN URINE	☐	☐
PUFFINESS OR SWOLLEN ANKLES	☐	☐
DIABETES OR SUGAR IN YOUR URINE	☐	☐
ANY SERIOUS DISEASE	☐	☐
IF YES, WHAT? _____		
ANY X-RAYS	☐	☐
IF YES, FOR WHAT? _____		

2. WHEN YOU WERE PREGNANT WITH THIS CHILD DID YOU TAKE ANY OF THESE MEDICINES?

	YES	NO
VITAMINS	☐	☐
IRON	☐	☐
ASPIRIN	☐	☐
MEDICINE FOR NAUSEA OR VOMITING RELIEF	☐	☐
MEDICINES FOR BODY SWELLING	☐	☐
MEDICINE FOR HIGH BLOOD PRESSURE	☐	☐
MEDICINES FOR INFECTIONS	☐	☐
SLEEPING MEDICINE	☐	☐
ANY OTHERS	☐	☐
IF YES, WHAT? _____		

3. DURING YOUR PREGNANCY WITH THIS CHILD

	YES	NO
DID YOU SMOKE CIGARETTES?	☐ 81	☐
IF YES, DID YOU SMOKE 2 PACKS A DAY OR MORE?	☐ 82	☐
OR 1 TO 2 PACKS A DAY?	☐ 83	☐
OR LESS THAN 1 PACK A DAY?	☐ 84	☐

4. HOW MUCH DID YOUR CHILD WEIGH AT BIRTH?

_____ POUNDS _____ OUNCES ☐ 85

5. DID YOUR CHILD HAVE ANY OF THESE PROBLEMS AT BIRTH?

	YES	NO
PREMATURE	☐ 86	☐
JAUNDICE OR YELLOW COLOR	☐ 87	☐
DIFFICULTY WITH BREATHING DURING FIRST FEW DAYS	☐ 88	☐
ANEMIA (LOW BLOOD)	☐ 89	☐
INFECTION	☐ 90	☐
RH FACTOR	☐ *	☐
BLOOD TRANSFUSION(S)	☐ 92	☐

6. DID YOUR CHILD HAVE ANY OF THESE PROBLEMS AT BIRTH?

	YES	NO
POSTMATURE OR OVERDUE (Over 3 weeks)	☐	☐
DIFFICULTY IN TAKING FIRST BREATH	☐	☐
ANY OTHER PROBLEM(S)	☐	☐
IF YES, WHAT? _____		

7. DID YOU HAVE ANY OF THESE DIFFICULTIES WITH THE BABY'S BIRTH?

	YES	NO
LABOR LONGER THAN 24 HOURS	☐	☐
LABOR LESS THAN 2 HOURS	☐	☐
BLEEDING DURING LABOR	☐	☐

8. DID YOU HAVE ANY OF THESE DIFFICULTIES WITH THE BABY'S BIRTH?

	YES	NO
CESARIAN SECTION	☐ 93	☐
FORCEPS DELIVERY	☐ 94	☐
BORN FEET FIRST (BREECH)	☐ 95	☐

9. DID YOU TAKE YOUR BABY HOME FROM THE HOSPITAL AT THE USUAL TIME? YES ☐ NO ☐

IF NO, WHY NOT? _____

PLEASE CHECK THE ANSWER TO EACH OF THESE QUESTIONS BY MARKING ONE OF THE 3 BOXES AFTER EACH QUESTION AND ANSWER ONLY THOSE QUESTIONS WHICH APPLY TO YOUR CHILD AT HIS PRESENT AGE.

	ABOVE AVERAGE	AVERAGE	BELOW AVERAGE
1. I FEEL THAT GENERALLY MY CHILD'S PHYSICAL DEVELOPMENT IS	☐	☐	☐ 96
2. I FEEL THAT GENERALLY MY CHILD'S MENTAL DEVELOPMENT IS	☐	☐	☐ 97
3. I FEEL THAT GENERALLY MY CHILD'S EMOTIONAL DEVELOPMENT IS	☐	☐	☐ 98
4. I FEEL THAT THE AGE AT WHICH MY CHILD FIRST SAT UP WAS	☐	☐	☐ 99
5. I FEEL THAT THE AGE AT WHICH MY CHILD FIRST WALKED WAS	☐	☐	☐ 100
6. I FEEL THAT THE AGE AT WHICH MY CHILD FIRST TALKED WAS	☐	☐	☐ 101
7. I FEEL THAT MY CHILD'S LARGE MUSCLE COORDINATION (JUMPING, PLAYING BALL, ETC.) IS	☐	☐	☐ 102
8. I FEEL THAT MY CHILD'S SMALL MUSCLE COORDINATION (WRITING, USING SCISSORS, ETC.) IS	☐	☐	☐ 103
9. I FEEL THAT MY CHILD'S HEARING IS	☐	☐	☐ 104
10. I FEEL THAT MY CHILD'S VISION IS	☐	☐	☐ 105
11. I FEEL THAT MY CHILD'S GENERAL SCHOOL WORK IS	☐	☐	☐ 106
12. I FEEL THAT MY CHILD'S READING ABILITY IS	☐	☐	☐ 107
13. I FEEL THAT MY CHILD'S ARITHMETIC ABILITY IS	☐	☐	☐ 108
14. I FEEL THAT MY CHILD'S ABILITY TO CONCENTRATE ON HIS WORK IS	☐	☐	☐ 109
15. I FEEL THAT MY CHILD'S SPEAKING ABILITY IS	☐	☐	☐ 110
16. I FEEL THAT MY CHILD'S ABILITY TO GET ALONG WITH OTHERS IS	☐	☐	☐ 111

HISTORY OF PAST ILLNESSES

1. DOES YOUR CHILD HAVE ANY HEALTH PROBLEMS NOW?

YES ☐ NO ☐

IF YES, WHAT? _____

2. HAS YOUR CHILD EVER HAD A SERIOUS ILLNESS?

YES ☐ NO ☐

IF YES, WHAT? _____

3. HAS YOUR CHILD EVER SWALLOWED ANYTHING HARMFUL?

YES ☐ NO ☐

IF YES, WHAT WAS SWALLOWED AND AT WHAT AGE?

_____

4. HAS YOUR CHILD EVER HAD

	YES	NO
A BROKEN BONE	☐ 112	☐
BEEN KNOCKED OUT OR UNCONSCIOUS	☐ 113	☐
ANY OTHER SERIOUS INJURY	☐ 114	☐
IF YES, WHAT? _____		
REPEATED EAR INFECTIONS	☐ 115	☐
PNEUMONIA	☐ 116	☐
ALLERGIC SKIN RASH	☐ 117	☐
ALLERGIC REACTION TO FOOD	☐ 118	☐
STREP THROAT	☐ 119	☐
ROSEOLA ("BABY MEASLES")	☐ 120	☐
ASTHMA	☐ 121	☐
ALLERGIC REACTION TO MEDICINE	☐ 122	☐
CONVULSION	☐ 123	☐
RED OR 10-DAY MEASLES	☐ 124	☐
GERMAN OR 3-DAY MEASLES	☐ 125	☐
CHICKEN POX	☐ 126	☐
MUMPS	☐ 127	☐
SCARLET FEVER	☐ 128	☐
URINARY TRACT INFECTION	☐ 129	☐
CONVULSIONS WITHOUT FEVER	☐ 130	☐
ASTHMA OR WHEEZING IN THE PAST YEAR	☐ 131	☐

5. HAS YOUR CHILD HAD ANY OF THESE OPERATIONS?

	YES	NO
TONSILLECTOMY	☐ 132	☐
CIRCUMCISION	☐ 133	☐
APPENDECTOMY	☐ 134	☐
HERNIA REPAIR	☐ 135	☐
ANY OTHERS	☐ 136	☐
IF YES, WHAT? _____		

	YES	NO
6. DOES YOUR CHILD HAVE FREQUENT COLDS, COUGHS, OR RUNNY NOSE?	☐ 137	☐
7. HAS A DOCTOR EVER SAID YOUR CHILD IS ALLERGIC?	☐ 138	☐
8. HAS YOUR CHILD EVER BEEN HOSPITALIZED FOR AN ILLNESS OR INJURY NOT ALREADY MENTIONED?	☐	☐
IF YES, WHAT? _____		
9. HAS YOUR CHILD EVER HAD ALLERGY TESTING?	☐	☐

MEDICATIONS AND IMMUNIZATIONS

	YES	NO	YEAR
1. DID CHILD HAVE INITIAL BABY SERIES OF 3 DPT SHOTS?	☐ 147	☐ 148	149
2. DID CHILD HAVE INITIAL BABY SERIES OF 2 (or 3) ORAL POLIO?	☐ 150	☐ 151	152
3. HAS CHILD HAD A DPT OR DT BOOSTER IN PAST 5 YEARS?	☐ 153	☐ 154	155
4. HAS CHILD HAD AN ORAL POLIO BOOSTER IN PAST 5 YEARS?	☐ 156	☐ 157	158
5. HAS CHILD HAD SMALLPOX VACCINATION IN PAST 5 YEARS?	☐ 159	☐ 160	161
6. HAS CHILD HAD A MEASLES VACCINATION ("REGULAR MEASLES")?	☐ 162	☐ 163	164
7. HAS CHILD HAD MUMPS VACCINE SHOT?	☐ 165	☐ 166	167
8. HAS CHILD HAD GERMAN MEASLES (RUBELLA) VACCINE SHOT?	☐ 168	☐ 169	170
9. HAS CHILD EVER HAD A POSITIVE TUBERCULIN TEST?	☐ 171	☐ 172	173
10. HAS CHILD HAD A TUBERCULIN TEST IN THE PAST YEAR?	☐ 174	☐ 175	176
11. DOES YOUR CHILD TAKE FLUORIDES BY MOUTH (FOR TEETH) REGULARLY?	☐ 177	☐ 178	

12. DOES YOUR CHILD TAKE VITAMINS REGULARLY?	☐	☐
13. DOES YOUR CHILD TAKE ANY OTHER MEDICINES REGULARLY?	☐	☐
IF YES, WHAT? _____		
14. HAS YOUR CHILD EVER SEEN A DENTIST?	☐	☐
15. HAS YOUR CHILD SEEN A DENTIST IN THE PAST YEAR?	☐	☐
16. DOES YOUR CHILD HAVE A DENTAL PROBLEM?	☐	☐

IDENTIFYING DATA

1. CHILD'S FATHER'S PRESENT AGE? _____ YEARS

2. WHAT IS THE CHILD'S FATHER'S USUAL OCCUPATION?

_____

3. WHAT IS YOUR CHILD'S FATHER'S RACE? (Check one)

WHITE-CAUCASIAN ☐ 139 BLACK-NEGRO ☐ 140
YELLOW-ORIENTAL ☐ 141 OTHER ☐ 142
IF OTHER, WHAT? _____

4. WHAT IS YOUR RACE? (MOTHER) (Check one)

WHITE-CAUCASIAN ☐ 143 BLACK-NEGRO ☐ 144
YELLOW-ORIENTAL ☐ 145 OTHER ☐ 146
IF OTHER, WHAT? _____

IDENTIFYING DATA (cont'd.)

5. MOTHER'S AGE? _____ YEARS _____ MONTHS

6. DOES MOTHER HAVE AN OCCUPATION OTHER THAN HOUSEWIFE? YES ☐ NO ☐
IF YES, WHAT? _____

7. DOES YOUR CHILD HAVE A REGULAR DOCTOR? YES ☐ NO ☐
IF YES, WHO? _____

8. PLEASE CHECK THE ONE BOX THAT BEST DESCRIBES MOTHER'S PRESENT STATUS.

MARRIED ☐ REMARRIED ☐ NEVER MARRIED ☐
SEPARATED ☐ DIVORCED ☐ WIDOWED ☐

9. THIS CHILD IS NOW LIVING WITH WHOM?

MOTHER ☐ FATHER ☐ OTHER ☐
IF OTHER, WHO? _____

THANK YOU FOR COMPLETING THIS FORM – DO NOT GO ANY FURTHER

BEST COPY AVAILABLE

TO BE FILLED OUT AT THE MHC APPOINTMENT BY NURSE-PRACTITIONER

PEDIATRIC HEALTH TESTING
NURSE PRACTITIONER EXAMINATION

290 EXAM NOT DONE

1. GENERAL & PSYCHOLOGICAL 179 NORM — 180 TND
   - GENERAL APPEARANCE NORM — 181 ABN
   - ACTIVITY OR DEVELOPMENT NORM — 182 ABN

2. HEAD 183 NORM — 184 ABN — 185 TND

3. EYES 186 NORM — 187 TND
   - FUNDI OR RED REFLEX NORM — 188 ABN — 189 TND
   - PUPILS NORM — 190 ABN
   - CONJUNCTIVA NORM — 191 ABN
   - LID MARGINS NORM — 192 ABN
   - STRABISMUS ABS — 193 PRES — 194 TND
   - OTHER ABNORMALITY — 195 PRES

4. EARS 196 NORM — 197 TND
   - TYMPANIC MEMBRANES NORM — 198 ABN — 199 TND
   - OTHER ABNORMALITY — 200 PRES

5. NOSE 201 NORM — 202 TND
   - EXUDATE ABS — 203 PRES
   - TURBINATES NORM — 204 ABN
   - OTHER ABNORMALITY — 205 PRES

6. MOUTH & PHARYNX 206 NORM — 207 TND
   - TEETH NORM — 208 ABN
   - PHARYNX NORM — 209 ABN — 210 TND
   - OTHER ABNORMALITY — 211 PRES

7. NECK 212 NORM — 213 TND
   - ADENOPATHY ABS — 214 PRES
   - THYROID NORM — 215 ABN
   - OTHER ABNORMALITY — 216 PRES

8. HEART 217 NORM — 218 TND
   - RHYTHM NORM — 219 ABN
   - SIGNIFICANT MURMUR ABS — 220 PRES — 221 TND
   - OTHER ABNORMALITY — 222 PRES

9. LUNGS AND CHEST 223 NORM — 224 TND
   - BREATH SOUNDS NORM — 225 ABN — 226 TND

9. (Cont.) AXILLARY HAIR 227 ABS — 228 PRES — 229 TND
   - OTHER ABNORMALITY — 230 PRES

10. ABDOMEN 231 NORM — 232 TND
    - LIVER NORM — 233 ENL
    - SPLEEN NORM — 234 ENL
    - MASS ABS — 235 PRES
    - OTHER ABNORMALITY — 236 PRES

11. GENITALIA & SEXUAL DEVELOPMENT — 237 TND

    MALE 238 NORM
    - TESTES ABS — 239 UND B — 240 UND U
    - PENIS 241 CIRC — 242 NOT C
    - SCROTUM NORM — 243 ABN
    - BREASTS 244 INF — 245 PUB — 246 ABN
    - PUBIC HAIR 247 ABS — 248 PRES
    - OTHER ABNORMALITY — 249 PRES

    FEMALE 250 NORM
    - LABIAL ADHESION ABS — 251 PRES
    - CLITORAL SIZE NORM — 252 ABN
    - MENSES STARTED (Yes) 253 YES — 254 NO
    - PUBIC HAIR 255 ABS — 256 PRES
    - BREASTS 257 INF — 258 PUB — 259 ABN
    - OTHER ABNORMALITY — 260 PRES

12. SKIN 261 NORM — 262 TND
    - DIAPER RASH ABS — 263 PRES
    - ECZEMA ABS — 264 PRES
    - ANAL AREA NORM — 265 ABN
    - OTHER ABNORMALITY — 266 PRES

13. EXTREMITIES 267 NORM — 268 TND
    - FEMORAL PULSE NORM — 269 AB/↓ — 270 TND
    - SUSPECTED Hip or Foot PROB ABS — 271 PRES
    - OTHER ABNORMALITY — 272 PRES

14. BACK AND SPINE 273 NORM — 274 ABN — 275 TND

15. NEUROLOGICAL SYSTEM 276 NORM — 277 ABN — 278 TND

16. COMMENTS OR SPECIFIC ABNORMALITIES

N. P. I.D. # 279 ☐☐☐☐☐

_____ R.N., P.N.P.
(SIGNATURE)

_____ M.D.
(SUPERVISORY PEDIATRICIAN)

Date_____

I.D.#_____

PRESCHOOL HEALTH QUESTIONNAIRE

TO BE COMPLETED BY THE CHILD'S PARENT OR GUARDIAN

Your answers to the following questions will assist us in obtaining an accurate and complete medical history for your child, and help direct our attention to your concerns when we discuss with you your child's health.

YOUR PRESCHOOL MEDICAL STAFF

Child's Name_____ Birth Date_____ Sex____ Race_____
last first middle

Parent or Guardian_____ Address_____ Phone_____
(or message phone)

Which doctor or clinic has been taking care of your child?_____

Approximately when was your child's last routine check-up?_____

Which doctor or clinic will take care of your child in the future?_____

If seen at , what is your child's clinic number?_____

CIRCLE THE CORRECT ANSWER: If uncertain, answer with a question mark. EXAMPLE: (No) Yes

While the Mother was pregnant with this child, did she have any difficulties?.....No Yes

Did she go to a physician or clinic regularly during her pregnancy?.....Yes No

Was the baby born within 2 weeks of the expected time?.....Yes No

How much did the baby weigh at birth _____

Were there any problems during the labor or delivery?.....No Yes

Was there anything wrong with your baby at birth?.....No Yes

Did the baby have any trouble in the newborn nursery?.....No Yes

Did your baby come home from the hospital with the mother?.....Yes No

Has your child:

Ever been put in a hospital?.....No Yes

Had his tonsils taken out?.....No Yes

Ever had a severe head injury or been knocked out?.....No Yes

Broken any bones?.....No Yes

Ever been seriously burned?.....No Yes

Taken any medicines or poisons accidentally?.....No Yes

Had any other serious illnesses, accidents, or injuries?.....No Yes

Please go on to next page

Check any of the following diseases that the child has had:

☐ 10 day or Red Measles	☐ Mumps	☐ Pneumonia
☐ 3 day or German Measles	☐ Chicken Pox	☐ Tuberculosis
☐ Scarlet Fever	☐ Rheumatic Fever	☐ Whooping Cough

Is the child's father in good health?.....Yes No

Is the child's mother in good health?.....Yes No

Do the CHILD and BOTH parents live together?.....Yes No

PLEASE ANSWER THE FOLLOWING QUESTIONS ABOUT ALL YOUR CHILDREN:

	Name	Age	Sex	State of Health	Lives at Home? (yes or no)
1st born					
2nd born					
3rd born					
4th born					
5th born					

Has the child's mother had any abortions, miscarriages, or stillbirths?..... No Yes

Have any of your children died?.....No Yes

Circle any of the following diseases that the child's parents, sisters, brothers, grandparents, aunts, uncles, or cousins have had:

Diabetes	Birth Defects	Bleeders	Asthma
Rheumatic Fever	Convulsions	Anemia	Hayfever
Heart Disease	Mental Retaration	Cancer	Skin allergies

Other Diseases: _____

Has your child grown too slowly?.....No Yes

Is your child's appetite usually good?.....Yes No

Do you think the child is (circle one): Overweight? Underweight? Normal?

Is the child allergic to any foods?.....No Yes

Is your child allergic to any medicines?.....No Yes

Has the child ever had asthma or wheezing?.....No Yes

Has the child had trouble with hay fever?.....No Yes

Does the child tend to have a stuffy nose or "constant cold"?.....No Yes

Please go on to next page

Has the child had an ear infection more than three times?---------- No Yes

Has the child ever had a draining or running ear?---------- No Yes

Does your child hear well?---------- Yes No

Do the child's eyes ever cross?---------- No Yes

Does your child see well?---------- Yes No

Is your child either wearing or supposed to be wearing glasses?---------- No Yes

Does your child:

Have trouble with his teeth?---------- No Yes

Have a heart murmur or anything wrong with his heart?---------- No Yes

Have a rupture or a hernia of the groin or naval?---------- No Yes

Often wet the bed?---------- No Yes

Have trouble with his feet or legs?---------- No Yes

Have low blood or anemia?---------- No Yes

Is your child usually happy?---------- Yes No

Does your child get along with other children?---------- Yes No

Does your child seem different from other children?---------- No Yes

Which of the following have been problems (Circle)

Won't mind	Trouble sleeping	Cries too much	Lying
Clumsiness	Nightmares	Fights too much	Stealing
Too active	Nailbiting	Clings to Mother	Starting Fires
Easily upset	Thumbsucking	Clings to Friends	Too Shy
Bad temper	Stuttering	Can't toilet train	Jealousy
High strung or nervous	Breathholding	Breaking things on purpose	Can't stick to one thing long enough

Has your child ever had a convulsion, fit, or spell?---------- No Yes

Did your child sit up by himself at 9 months?---------- Yes No

Did the child walk by himself at 15 months?---------- Yes No

Is your child clumsy with his hands?---------- No Yes

Did your child ride a tricycle by age 3?---------- Yes No

Please go on to the last page

Which hand does your child use to eat with (circle) Right Left Both

Which hand does your child use to draw with(circle) Right Left Both

Which hand does your child use to throw a ball (circle) Right Left Both

Could your child dress himself by age four?.....Yes No

Could your child say understandable words (other than Mama or Dada) by age 18 mos.?....Yes No

Could your child put words together in sentences by 3 years?.....Yes No

Does your child understand what people say to him?.....Yes No

Does the child like to be read to?.....Yes No

Does your child like to watch TV?.....Yes No

Do you think your child's play and thinking is as good as most children his age?.....Yes No

At this time, your child can do things as well as a _____year old.

Circle any of the following problems your child has had:

Drooling	Falls a lot	Does not understand speech	Stutters
Clumsiness	Temper Tantrums	Does not talk well	Can't sit still

List the dates on which your child received the following immunizations:

	Basic Series			Boosters	
DPT(3-in-one)	_____	_____	_____	_____	_____
Polio by mouth	_____	_____	_____	_____	_____

Has your child had a shot for ten day measles?.....Yes No

Has your child had a 3 day measles shot (German measles or Rubella).....Yes No

Has your child been exposed to anyone with tuberculosis (TB)?.....No Yes

Has the child been skin tested for TB?.....Yes No

Was the skin test negative (no reaction)?.....Yes No

PLEASE READ AND SIGN THE FOLLOWING STATEMENT:

I give my permission for _____ to have all necessary medical examinations, immunizations, laboratory tests, and treatments from physicians, dentists, and other health personnel of the pre-school health program, and I authorize them and any other health professionals who have taken care of my child to share medical information when necessary.

_____

Date Signature of Parent or Guardian

PAST MEDICAL HISTORY AND FAMILY MEDICAL HISTORY

PREGNANCY - COMPLICATIONS, AMOUNT OF PRENATAL CARE, AND DURATION OF PREGNANCY:

While the mother was pregnant with this child, did she have any difficulties?

Did she go to a physician of clinic during during her pregnancy?

Did the pregnancy last the usual nine months? (or, did the baby come on time?)

What was your your baby's weight at birth?

PERINATAL - COMPLICATIONS:

Was there any trouble at birth? (or, Was there anything wrong with your baby at birth?

Did your baby have any trouble in the newborn nursery?

Did your baby come home from the hospital with you?

ACCIDENTS, INJURIES, HOSPITALIZATIONS:

Has your child: Ever been put in a hospital?

Had his tonsils taken out?

Ever had a severe head injury or been knocked out?

Broken any bones?

Ever been seriously burned?

Taken any medicines or poisons accidentally?

Had any other serious accidents or injuries?

INFECTIOUS DISEASES:

Has your child ever had measles? (10-day measles, old fashioned or hard measles)

Has your child ever had rubella? (3-day measles, German or mild measles)

Has your child ever had chicken pox, mumps, whooping cough (pertussis), or puemonia?

FAMILY - MEMBERS IN HOME, NUMBER OF MOTHER'S PREG'S (gravity),LIVE BIRTHS (parity), and MISCARRIAGES (abortus)

Have the child"s parents, grandparents, aunts, uncles, brothers, sisters, or cousins had: diabetes,rheumatic fever, heart disease, birth defects, convulsions, mental retardation, asthma, hay fever, skin allergies, bleeders, anemia, cancer, or TB?

REVIEW OF SYSTEMS (HEALTH PROBLEMS ASSOC'D WITH BODY PARTS OR FUNCTIONS)

The following questions have been arranged in a Health Questionnaire form, which can be filled out by the parent before the interview assisting the historian in obtaining a more complete history, and saves time by directing attention to problem areas.

CIRCLE THE CORRECT ANSWER (If uncertain, answer with a question mark)

Has your child grown too slowly?..... no yes

Is the child's appetite usually good?..... yes no

Do you think your child is (circle one): Overweight? Underweight? Normal?

Are you able to give your child the right kind of food to grow normally?..... yes no

Is the child allergic to any foods?..... no yes

Is your child allergic to any medicines?..... no yes

Has the child ever had asthma or wheezing?..... no yes

Has the child had trouble with hay fever?..... no yes

Does the child tend to have a stuffy nose or "constant cold"?..... no yes

Has the child had an ear infection more than three times?..... no yes

Has the child ever had a draining or runny ear?..... no yes

Does your child hear well?..... .yes no

Do the child's eyes ever cross?..... .no yes

Does the child see well?..... .yes no

Is your child either wearing or supposed to be wearing glasses?..... .no yes

Does your child:

Have trouble with his teeth?..... .no yes

Have a heart murmur or anything wrong with his heart?..... .no yes

Have a rupture or a hernia of the groin or naval?..... .no yes

Often wet the bed?..... .no yes

Have trouble with his feet or legs?..... .no yes

Have low blood or anemia?..... .no yes

Is your child usually happy?..... .yes no

Does your child get along with other children?..... .yes no

Does your child seem different from other children?..... .no yes

APPENDIX NO. 2

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The following consultants provided the authors with specific advice on one or more of the specific areas of screening, and reviewed the chapter for completeness and accuracy.

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APPENDIX NO. 4

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